GOVERNMENT OF INDIA

KRISHNA WATER DISPUTES TRIBUNAL

THE REPORT

OF

THE KRISHNA WATER DISPUTES TRIBUNAL

WITH THE DECISION

IN THE MATTER OF WATER DISPUTES REGARDING

THE INTER-STATE RIVER KRISHNA AND THE RIVER VALLEY THERE OF

BETWEEN

1. The State of Maharashtra
2. The State of Karnataka
3. The State of Andhra Pradesh
4. The State of Madhya Pradesh
5. The State of Orissa

} Parties to the dispute until 19th April, 1971.

VOLUME I

NEW DELHI
1973

ERRATA

Sl.No.	Page No.	Column	Line No.	For	Read
1	2	3	4	5	6
1.	(viii)	First	13	Advised	Adviser
2.	"	Second	12	Janardhan	Janardan
3.	2	First	12	he State	the State
4.	5	Second	30	allged	alleged
5.	7	Second	21	oppointing	appointing
6.	8	Second	35	lo whills	low hills
7.	9	First	3	months	mouths
8.	9	First	4	is lands	islands
9.	9	First	11	Nil	Nile
10.	10	Second	10	Bennihala	Bennihalla
11.	10	Second	46	Up stream	upstream
12.	11	Second	6	2nd	and
13.	11	Table	S. No. 17 under Col. 3	66	62
14.	12	Below the table	1	Streame	Streams
15.	12	Second	37 below the table	Add the word "and" between the words "Tungabhadra" and "of"	
16.	13	Second	5	dence	dense
17.	13	Second	32	section	sections
18.	14	Table (Mysore)	Col. 1 last line	Chikmagalar	Chikmagalur
19.	15	"	Col. 1 first line	Tumkar	Tumkur
20.	15	"	Col. 6 Second line	394	39.4
21.	17	Table	Under Col. 7 against Lower Bhima K. 6	area	areas
22.	18	First	13	arithmatic	÷arithmetic
23.	19	—	Foot note (11)	MYK III p.,	MYK III p. 90,
24.	21	Second	30	of the sea.	to the sea.
25.	21	Second	34	techniques	technique
26.	21	Foot note (16)		Vol. I, pp. 259.	Vol. I, p. 259.
27.	22	Table showing sourcewise irrigation	Col. 4 against Sl. No. 4	135.7	136.7
28.	23	First	Last	Muniyern	Muniyeru
29.	27	Second	19	Add the word "with" after the word "rain-fed"	
30.	29	Second	43	enginees	engineers
31.	32	Second	12th below the Table	right	rights
32.	34	Foot note (8)	Last line	p. 24	p. 224
33.	36	First		Transpose line 22 to 23 and vice versa	
34.	37	First	Last line	Sugarmul	Sagarmul
35.	37	—	Foot note	APDD	APDK
36.	37	Second	First	Mukherjee	Mukherjea
37.	37	Second	27-28	ratification	ratifications
38.	38	First	3 of para 2	taking	making
39.	38	First	in table "Projects under construction"	Mulehir Weir	Mulchir Weir
40.	39	First	3 below the table	1940 5 T. M. Cft.,	1940.5 T.M. Cft.,
41.	39	—	In statement 'B' Col. 2	Figure 173 may be read against "Koyna H.E. and Irrigation Project"	
42.	40	Second	6th line below the Table	Padmanahba	Padmanabha

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COMPOSITION OF THE KRISHNA WATER DISPUTES TRIBUNAL

CHAIRMAN

Shri R. S. Bachawat,

(Judge of the Supreme Court of India until 31-7-1969).

MEMBERS

Shri Shamsher Bahadur,

(Judge of the Punjab & Haryana High Court until 14-11-1969).

Shri D. M. Bhandari,

(Chief Justice of the Rajasthan High Court until 15-12-1969).

SECRETARY

Shri M. Prasad

CONTENTS

VOLUME I

Government of India
Krishna Water Disputes Tribunal
D-27, New Delhi South Extension, Part-II

No. 18(5)/73-KWDT.

Dated the 24th December, 1973

To

The Secretary to the Government of India,
Ministry of Irrigation & Power,
NEW DELHI.

Sir,

On the 10th April, 1969, the Government of India constituted the Krishna Water Disputes Tribunal *vide* Notification No. S.O. 1419 dated the 10th April, 1969 issued by the Government of India, Ministry of Irrigation and Power. Vacancies in the offices of Members of the Tribunal were filled by fresh appointments made by the Government of India *vide* Notification Nos. S.O. 1738 dated the 3rd May, 1969 and S.O. 4858 dated the 4th December, 1969 issued by the Government of India, Ministry of Irrigation & Power.

On the 10th April, 1969, the Government of India, Ministry of Irrigation & Power, referred to the Tribunal for adjudication the water dispute regarding the inter-State river Krishna and the river valley thereof *vide* Reference No. DW II. 32(19)/68 dated the 10th April, 1969. On the 18th July, 1970, the 2nd September, 1970 and the 20th February, 1971, the Government of India, Ministry of Irrigation & Power referred to the Tribunal certain matters connected with and relevant to the said water dispute *vide* Reference Nos. 4/2/70-WD dated the 18th July, 1970, 4/2/70-WD(i) dated the 2nd September, 1970, 4/2/70-WD (ii) dated the 2nd September, 1970 and 4/2/70-WD, dated the 20th February, 1971.

The Tribunal has investigated the matters referred to it, and has prepared its report setting out the facts as found by it and giving its decision on the matters referred to it.

The unanimous report of the Tribunal is forwarded herewith.

Yours faithfully,

(R. S. Bachawat)
Chairman

(Shamsher Bahadur)
Member

(D. M. Bhandari)
Member

Enclosure : Report (Volumes I-IV).

Representatives of the State Governments before the Krishna Water Disputes Tribunal.

I. *For the State of Maharashtra.*

Advocates

1. Shri H. M. Seervai, Advocate General.

and

2. Shri T. R. Andhyarujina, Advocate.

Instructed by

3. Shri K. J. Choksi, Solicitor.

Other representatives

1. Shri K. K. Framji, Technical Consultant.
2. Shri N. S. Pardasani, Secretary to Government. (up to 15-11-1969).
3. Shri B. A. Kulkarni, Secretary to Government. (from 16-11-1969).
4. Shri E. C. Saldanha, Joint Secretary.
5. Shri K. S. Shankar Rao, Deputy Secretary.
6. Shri V. B. Mulye, Under Secretary.
7. Shri N. M. Jog, Under Secretary.

II. *For the State of Karnataka.*

Advocates

1. Shri T. Krishna Rao, Ex-Advocate General.
2. Shri A. G. Holla, Advocate.
3. Shri S. S. Javali, Advocate, Supreme Court.

The following Advocates also appeared in the initial stages :—

1. Shri M. K. Nambyar, Senior Advocate, Supreme Court.
2. Shri V. S. Malimath, Advocate General.

Other representatives

1. Shri B. C. Angadi, Director, Water Resources Development Organisation. (up to 31-8-1972).
2. Shri S. G. Balekundry, Chief Engineer. (from 1-9-1972).
3. Shri B. Subramanyam, Superintending Engineer.
4. Shri M. V. Aswathnarayana Setty, Adviser.

III. *For the State of Andhra Pradesh.*

Advocates

1. Shri P. Ramachandra Reddi, Advocate General.
2. Shri Anwarulla Pasha, Advocate.
3. Shri D. V. Sastri, Advocate.

The following Advocates also appeared in the initial stages :—

1. Shri A. K. Sen, Senior Advocate, Supreme Court.
2. Shri D. Narasa Raju, Advocate.
3. Shri P. Rami Reddi, Standing Counsel for the Government of Andhra Pradesh at Delhi.

Other representatives

1. Shri M. Sitarama Sastry, Special Officer (Chief Engineer).
2. Shri G. K. S. Iyengar, Superintending Engineer.
3. Shri B. Gopalakrishna Murty, Superintending Engineer.
4. Shri K. Ramachandran, Research Officer.

The following representatives also appeared in the initial stages :—

1. Shri A. R. Venkataraman, Adviser.
2. Shri Moti Ram, Adviser.
3. Shri Mir Jafar Ali, Adviser.

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IV. *For the State of Madhya Pradesh.* (*up to* 19-4-1971)

Advocates

1. Shri K. A. Chitale, Advocate General.
2. Shri U. N. Bhachawat, Advocate.
3. M/s. J. B. Dadachanji & Co., Advocates.
4. Shri V. K. Sanghi, Advocate.

Other representatives

1. Shri S. B. Lal, Secretary to Government.
2. Shri M. S. Chaudhary, Additional Chief Secretary to Government.
3. Shri T. N. Bahel, Special Commissioner.
4. Shri K. L. Handa, Irrigation Advised and Chief Engineer.
5. Shri R. L. Gupta, Deputy Chief Engineer.

V. *For the State of Orissa.* (up to 19-4-1971).

Advocates

1. Shri Asok Das, Advocate General.
2. Dr. L. M. Singhvi, Senior Advocate, Supreme Court.
3. Shri Santosh Chatterjee, Advocate, Supreme Court.
4. Shri Bimal Krushna Pal, Advocate.
5. Shri Madhabananda Das, Advocate.
6. Shri Govind Das, Advocate, Supreme Court.

Other representatives

1. Shri U. C. Agarwal. Secretary to Government.
2. Shri Janardhan Tripathy, Chief Engineer.

Shri K. C. Gantavat, Additional Chief Engineer.

4. Shri Nilakantha Mishra, Superintending Engineer.

CHAPTER I

Genesis of the dispute

Before the middle of the nineteenth century, there was little development of the water resources of the Krishna basin. Numerous tanks and small diversion works were in operation, but no major work had been constructed. The rivers of the Krishna river system rising in the Western Ghats had plentiful supplies during the monsoon months but most of the water was wasted to the sea. From about 1855 onwards, major irrigation works were undertaken. Since 1855 up to 1928, the Krishna Delta, canal system, the Kurnool Cuddapah Canal, the Mutha canals, the Nira Left Canal, the Vanivilas Sagar and the Nira Right Canal were constructed. During the period 1918 to 1930, the Tatas constructed the Tata Hydel Works for generating hydro power by westward diversion of water. Until the conclusion of the Second World War, the engineering works for development of water resources were few in number, the water supply was ample in relation to the demand upon it and no use of water seriously affected other uses. There was, therefore, little scope for disputes regarding the use, control and distribution of the Krishna waters. British India was subject to the unitary control of the Government of India and even the Princely States were under its paramountcy control. There were minor disputes relating to the Tungabhadra waters but they were amicably settled in 1892 and 1933.

Under the Government of India Act, 1935, water became an exclusive provincial subject and specific provision was made for settlement of water disputes. Before Independence, the Provinces of Madras and Bombay, the States of Hyderabad and Mysore and a few other Princely States had riparian interests in the Krishna basin. The agreements of June and July 1944 provisionally settled disputes concerning the sharing of the Tungabhadra waters, and enabled the States concerned to undertake the construction of the Tungabhadra Project, the Rajolibunda Diversion Scheme, the Bhadra Reservoir Project and the Tunga Anicut. The Radhanagari Project and Ghataprabha Left Bank Canal were also undertaken before 1950.

In 1950, when the Constitution came into force, the entire Krishna basin fell within the territories of the States of Bombay, Mysore, Hyderabad and Madras. There was planning at the State and National levels for intensive development of water resources. The States of Bombay, Hyderabad and Madras proposed important schemes for utilisation of the Krishna waters, like the Koyna, Upper Krishna, Lower Krishna, Krishna Pennar and other projects. At an inter-State conference held in July, 1951 at New Delhi, a memorandum of agreement was drawn up apportioning the available supply of the Krishna river system among the four riparian States.

Apparently, the memorandum of agreement drawn up at the inter-State conference in July 1951 had settled the conflicting claims of the riparian States with regard to the supplies of the Krishna river system for a period of 25 years. But the settlement was more apparent than real. As the State of Mysore refused to ratify the agreement, it was inevitable that disputes regarding the validity of the agreement would arise sooner or later. In the meantime, the Planning Commission continued to clear projects on the assumption that the memorandum of agreement of 1951 was binding upon the States.

Extensive territorial changes were made in the Krishna basin by the Andhra State Act, 1953 as from the 1st October, 1953 and the States Reorganisation Act, 1956 as from the 1st November, 1956. The new States of Bombay, Mysore and Andhra Pradesh became the riparian States in place of the old States of Bombay, Hyderabad, Mysore and Madras. In view of the extensive territorial changes, the Central Water and Power Commission drew up a scheme for re-allocation of the Krishna waters, but the scheme was not accepted by the States. An inter-State conference was held on the 26th and 27th September, 1960, but no settlement could be reached. The legal existence and validity of the agreement of 1951 were now vigorously challenged. The State Governments began to raise objections to the clearance of new projects on the basis of the 1951 allocations.

After 1951 and before September 1960, the States concerned undertook the construction of several important major projects such as the Nagarjunasagar, the Musi, the Tungabhadra High Level Canal Stage I, the Koyna Hydel Stage I, the Khadakwasla Stage I, the Ghataprabha Stage II, the Ghod and the Vir Dam.

More schemes were put forward by the State Governments and their aggregate demand was in excess of the available supplies. As the pressure on the available supplies increased, the disputes became more bitter and

vociferous. Objections were raised concerning Nagarjunasagar, Srisailam and Koyna projects.

In January 1962, the Mysore Government applied to the Central Government for a reference of the disputes to the Tribunal. In May 1961, the Central Government appointed the Krishna Godavari Commission and in August 1962, the Commission submitted their report. The Commission found that without further data it was not possible to determine the dependable flow accurately. They also found that the supplies available in the Krishna basin were inadequate to meet the demands of all the projects of he State Governments. In view of the shortage in the river supplies, they indicated the procedure that should be adopted with regard to the projects under construction and the new projects which the State Governments were anxious to undertake immediately. They put forward proposals for diversion of the Godavari waters into the Krishna and recommended further investigation. They also recommended that regular gauging should be carried out at key sites on the river system.

On the 23rd March, 1963, the Union Minister for Irrigation and Power stated that according to legal opinion at the highest level, the agreement of 1951 had become void, if it was not initially void, at least partially. He stated that new projects should not be held up pending final allocation of the Krishna supplies and should be cleared on the footing that the withdrawals of supplies by Maharashtra, Mysore and Andhra Pradesh should not exceed 400, 600 and 800 T.M.C. respectively. However, the States concerned were not agreeable to this interim allocation. In June 1963, the Maharashtra Government asked for reference of the disputes to the Tribunal.

Since September 1960, the Central Government has given clearance to several important major projects such as the Srisailam, the Tungabhadra High Level Canal Stage II, the Upper Krishna, the Malaprabha, the Bhima, the Kukadi, the Krishna, the Warna and the Koyna Hydel Stages II and III.

Action was also taken on the recommendations of the Krishna Godavari Commission. Investigations concerning suitable Godavari diversion links were made at the technical level, but no agreed formula was arrived at. Model experiments were conducted at research stations with a view to re-construct the yearly flow data at Vijayawada, but the reliability of the model experiments and the accuracy of the reconstructed flow data were disputed, and the problem of quantitative assessment of the dependable supply remained unsolved.

The Central Government tried their best to settle the dispute by negotiations. Several inter-State conferences were held, but the dispute could not be settled. Fresh applications for reference of the dispute were made by the State Governments in 1968 and 1969. Eventually in April 1969, the Central Government referred the disputes to this Tribunal.

In view of the re-organisation of States and the redistribution of the Tungabhadra Valley between the States of Mysore and Andhra Pradesh, disputes arose concerning the continuing validity of the earlier Tungabhadra agreements, the use, control and distribution of the Tungabhadra waters and the management of certain existing works on the Tungabhadra. These disputes were also referred to the Tribunal.

CHAPTER II

Reference and subsequent proceedings

Reference of the dispute : On the 10th April, 1969, the Government of India constituted the Krishna Water Disputes Tribunal. On the 3rd May, 1969 and the 4th December, 1969, vacancies in the offices of Members of the Tribunal were filled by fresh appointments.

On the 10th April, 1969, the Government of India referred to the Tribunal for adjudication the water dispute regarding the inter-State river Krishna and the river valley thereof emerging from the letters of the Mysore Government dated the 29th January, 1962 and the 8th July, 1968, the letters of the Maharashtra Government dated the 11th June, 1963 and the 26th August, 1968 and the letters of the Andhra Pradesh Government dated the 21st April, 1968 and the 21st January, 1969. The complaints of the State Governments were set out in the aforesaid letters. In the letter of reference, the Government of India requested the Tribunal to consider the representations of some of the States concerning the possibility of diversion of waters of the river Godavari to the river Krishna and the opposition of some of the other States to such diversion.

Summary of complaint of the Mysore Government : The memorandum of agreement drawn up by the Planning Commission regarding the distribution of the waters of the river Krishna between the States of Bombay, Madras, Hyderabad and Mysore as a result of the inter-State Conference held on the 27th and 28th July, 1951 is not binding as no agreement matured as a result of the Conference. The proposal of the Central Water & Power Commission regarding the re-allocation of the Krishna waters in consequence of the reorganisation of States and the statement of the Union Minister for Irrigation and Power in the Lok Sabha on March 23, 1963 regarding the interim allocation of the Krishna waters are not acceptable to Mysore. The proposed Srisailam and Nagarjunasagar Stage II projects, the erection of crest gates on the Nagarjunasagar dam and the proposed westward diversion of the Krishna waters in excess of 67.5 T.M.C. are objectionable. Mysore claims an equitable distribution of the waters of the Krishna and a stay of implementation of the projects of Andhra Pradesh and of Maharashtra's westward diversion of the Krishna waters in excess of 67.5 T.M.C.

Summary of complaint of the Maharashtra Government : The agreement of 1951 regarding the allocation of the Krishna waters is void and not binding. The interim allocation of the Krishna waters by the Union Minister on March 23, 1963 cannot be accepted. The implementation of Srisailam project, the erection of the Nagarjunasagar crest gates and the clearance of projects of the lower States without Maharashtra's prior consent are objectionable. Maharashtra claims an assessment of the dependable flow of the Krishna, an equitable apportionment of the Krishna waters and in case it is found that any State is utilising more than its legitimate share of the Krishna waters, an order directing it to release the excess waters and, if such release is impossible, an order directing it to make good the shortfall by diverting its share of the Godavari waters to the Krishna Valley.

Summary of complaint of Andhra Pradesh Government : The 1951 Agreement regarding allocation of the Krishna waters is valid and binding. Maharashtra and Mysore are committing breaches of the 1951 agreement. Moreover, Mysore is committing breaches of the 1944 agreement between Madras and Mysore concerning the Tungabhadra waters. Andhra Pradesh claims an injunction restraining Maharashtra and Mysore from undertaking works involving utilisation of more than their respective shares under the 1951 agreement, an injunction restraining Maharashtra from diverting westwards more than 67.5 T.M.C. of water for the Koyna project, an order directing Maharashtra to reduce the storage capacity of Koyna dam to 36 T.M.C., and an injunction restraining Maharashtra and Mysore from intercepting flows to the Delta and other irrigation works of Andhra Pradesh.

Parties to the dispute : The States of Andhra Pradesh, Maharashtra, Mysore, Madhya Pradesh and Orissa were the original parties to the water dispute. The States of Madhya Pradesh and Orissa were made parties as they were interested in the diversion of the Godavari waters to the Krishna. On the 19th April, 1971, all the parties jointly stated that none of the States would ask for a mandatory order for such diversion. Thereafter, Madhya Pradesh and Orissa were not interested in the Krishna case and they were discharged from the records of the case.

Subsequent references.—On the 18th July, 1970, the Government of India at the request of the Andhra Pradesh Government referred to the Krishna Water Disputes Tribunal matters concerning the release of waters by Mysore for the benefit of Andhra Pradesh from (i) the Upper Krishna Project; (ii) the Tungabhadra Left Bank Canal and (iii) the Bhima Project. On the 2nd September, 1970, matters concerning the release of waters by Maharashtra for the benefit of Mysore from (i) a storage dam at Ajra and (ii) the Koyna Project were referred to the Tribunal at the request of the Mysore Government. On the same day, matters concerning the agreements of 1892 and 1933 were referred to the Tribunal at the request of the Andhra Pradesh Government. On the 20th February, 1971, the Government of India at the request of the Andhra Pradesh Government referred to the Tribunal matters concerning the release of water from the Tungabhadra Reservoir to meet the requirements of the Kurnool-Cuddapah Canal and Rajolibunda Canal and as contribution to the Krishna and concerning the vesting in the Tungabhadra Board of the control of the Tungabhadra dam and reservoir and the main canal on the left side, the Munirabad Power House, the Rajolibunda Headworks and the length of the common canal of the Rajolibunda Project in the Mysore State limits.

Pleadings : The parties filed their statements of case and rejoinders (APK Volumes I to X, MRK Volumes I to VIII, MYK Volumes I to VIII, MPK Volumes I to III and ORK Volumes I and II) and also additional statements (S.P. Volumes I to IV). The pleadings clarify the disputes raised in the complaints made by the States concerned, and specify the reliefs claimed by them.

Maharashtra(1) prayed for (a) a declaration that the agreement of 1951 was invalid and/or had ceased to be operative, (b) allocation of the equitable share of the States in the dependable flow of the Krishna basin, (c) suitable provision for the sharing of the excess or deficiency of supplies when they would be more or less than the dependable flow, (d) direction for diversion of the waters of the river Godavari to the Krishna and (e) suitable machinery for implementing the order of the Tribunal.

Mysore (2) prayed for (a) allocation to the parties of the available waters in the Krishna river system determined at 75 per cent dependability ignoring the alleged agreement of 1951, (b) sharing of waters in years when the available supply would be more or less than the yield determined on the basis of 75 per cent dependability, (c) direction for diversion of surplus waters of the Godavari to the Krishna basin, (d) injunction restraining diversion of the waters of the Krishna beyond the Krishna basin, (e) stay of further implementation of Srisailam and Nagarjunasagar projects and (f) suitable machinery for implementation of the decision of the Tribunal.

Andhra Pradesh (3) prayed for a declaration that the agreement of 1951 was valid and binding and for suitable directions for implementation of the agreement. In case the agreement of 1951 was held to be not valid and binding, Andhra Pradesh prayed for (a) a declaration that the dependable yield of the river Krishna was 1745 T.M.C. of water, (b) direction for ensuring full supply in all years for projects committed before 1951 on a daily basis and for projects committed up to 1960 on a weekly basis, (c) allocation of the balance dependable yield without taking into consideration the diversion of water from the Godavari to the Krishna, (d) sharing of the excess flows over and above the dependable yield, (e) injunction restraining further westward diversion of the Krishna waters, (f) directions for the working of the Tungabhadra Left Bank Canal and other schemes in Mysore so that areas in Andhra Pradesh might not be deprived of the benefits and use of waters from those schemes, (g) implementation of the agreement of 1944 and (h) other reliefs.

In the supplemental pleadings (4) Andhra Pradesh prayed for (a) release of water from the Tungabhadra dam for the benefit of certain downstream projects and by way of contribution to the Krishna (b) vesting of the control and administration of certain works in the Tungabhadra Board and (c) directions for ensuring the share of Andhra Pradesh in the power generated at the Munirabad Power House.

Claims of Maharashtra, Mysore and Andhra Pradesh on the waters of the Krishna river system: In their statements of case, (5) Maharashtra, Mysore and Andhra Pradesh asserted the following claims to the utilisations of the waters of the Krishna river system for their existing and future projects:—

(1) MRK I pp. 223-226.
(2) MYK I pp. 64-65.
(3) APK I pp. 133-137.
(4) SP III pp. 12-23.
(5) MRK I p. 58; MRK II pp. 50-60; MYK I pp. 52-53; APK I pp. 123-125.

State	Gross utilisation in T.M.C.
Maharashtra	828.70
Mysore	1430.00
Andhra Pradesh	1888.10
	4146.80

In addition to the above demands, Maharashtra claimed 32.5 T.M.C. from regenerated flows and 70 to 80 T.M.C. for industrial use and domestic water supply, Andhra Pradesh claimed 120 T.M.C. for water supply and industrial use and Mysore stated that its demand for 1430 T.M.C. did not include its needs of water for domestic and industrial use.

Admittedly, there is not enough water in the Krishna river system to satisfy all the claims asserted against it by the three States.

Points of dispute: The preliminary point of dispute between the parties is whether any agreement regarding allocation of the Krishna waters was concluded as a result of the deliberations at the inter-State conference held in New Delhi on the 27th and 28th July, 1951 and, if so, whether the agreement is valid and subsisting. If there is a valid and subsisting agreement, it must be implemented. If not, the parties want an equitable apportionment of the Krishna waters for their beneficial uses, so that they may know the limits within which each can operate and may plan their water resources development accordingly. For the purpose of equitable allocation, it is necessary to determine the dependable flow of the Krishna, regarding which there is a dispute between the parties and to consider whether return flows from irrigation and the possibility of diversion of the waters of the river Godavari to the Krishna should be taken into account.

The next main point of dispute is how and on what basis the equitable apportionment should be made. This dispute requires consideration of the following matters; first, what are the relevant laws and guidelines on the subject; secondly, whether and to what extent the projects in operation or under construction should be protected and their utilisations preferred to contemplated uses; thirdly, whether any preference or priority should be given to irrigation over production of power; fourthly, whether more diversion of the Krishna waters outside the Krishna basin should be permitted; fifthly, how and on what basis the allocations for existing and future development of the concerned States should be made; sixthly, whether any direction for the release of water or for extension of irrigation facilities from any project in any State should be made for the benefit of another State under section 108(2) of the States Reorganisation Act; seventhly, whether any restrictions should be imposed on the uses of any State; eighthly, whether the allocations should be subject to review or modification; and ninthly, what machinery, if any, should be set up to make available and regulate the allocation of water to the States or otherwise to implement the decision of the Tribunal.

With regard to the Tungabhadra, a tributary of the Krishna, there are a number of specific points of dispute; first, whether the agreements of 1892, 1933, June 1944 and July 1944 are valid or subsisting; secondly, whether any directions should be given regarding the release of waters from the Tungabhadra dam; thirdly, whether any directions should be given regarding the control and administration of the Tungabhadra dam and reservoir and other works; and fourthly, whether Andhra Pradesh is entitled to any share in the power generated in the power house at Munirabad.

Finally, it is necessary to determine what reliefs should be given to the parties.

Issues.—Issues were raised on the 8th January, 1970. They were amended from time to time and were finally settled on the 14th April, 1971. The issues as finally settled are as follows :—

I. Was there any concluded agreement regarding allocation of the waters of the river Krishna as alleged? Was the agreement valid and enforceable? Is it still subsisting and operative and binding upon the States concerned in the present reference? If so, with what effect? Is there any breach of the agreement as alleged?

Sub-Issues

(1) Was there a concluded agreement as alleged? Was the agreement ratified, acted upon and treated as binding by the States concerned?

(2) Was the agreement in conformity with Article 299 of the Constitution? Was it within the purview of the article?

(3) Was the agreement inequitable or arbitrary or based on inadequate data? If so, with what effect?

(4) Did the agreement on its true construction allocate waters for specific projects? Have some of the projects been abandoned? If so, has the agreement become void?

(5) Has the agreement ceased to be operative on the reorganisation of the States?

(6) If the agreement is binding, what reallocation of waters, if any, should be made, in view of the reorganisation of States?

(7) Is there any breach of the agreement as alleged by Andhra?

(6) Is the validity of the agreement dependent upon the validity of the Godavari agreement.

II. What directions, if any, should be given for the equitable apportionment of the beneficial use of the waters of the Krishna river and the river valley?

Sub-Issues

(1) On what basis should the available waters be determined?

(2) How and on what basis should the equitable apportionment be made?

(3) What projects and works in operation or under construction, if any, should be protected and/or permitted? if so, to what extent?

(4) Should diversion or further diversion of the waters outside the Krishna drainage basin be protected and/or permitted? If so, to what extent and with what safe guards? How is the drainage basin to be defined?

(5) Should any preference or priority be given to irrigation over production of power?

(6) Has any State any alternative means of satisfying its needs? If so, with what effect?

(7) Is the legitimate interest of any State affected or likely to be affected prejudicially by the aggregate utilisation and requirements of any other State?

(8) What machinery, if any, should be set up to make available and regulate the allocations of waters, if any, to the States concerned or otherwise to implement the decision of the Tribunal.

III. Is the Agreement of July, 1944 valid and subsisting and, if so, with what effect? Was it invalid as Bombay, Sangli and Hyderabad were not parties to it? Was it rendered ineffective by the Supplemental Agreement of 1945? Did it survive on the merger of the Princely State of Mysore in the Republic of India? Has it ceased to be operative on the reorganisation of States?

IV. Are the Agreements of 1892 and 1933 so far as they relate to river Krishna and its tributaries subsisting and, if so, with what effect? Did they survive on the merger of the Princely State of Mysore in the Republic of India? Have they ceased to be operative on the reorganisation of States?

IV (A). Did the agreement of June, 1944 survive on the —

(i) coming into force of the Indian Independence Act;

(ii) coming into force of the Constitution of India; and

(iii) merger of the princely State of Hyderabad in the Republic of India?

Has the agreement ceased to be operative on the reorganisation of States?

IV(B). (a) Should any directions be given for the release of waters from the Tungabhadra Dam —

(i) for the benefit of the Kurnool Cuddapah canal;

(ii) for the benefit of the Rajolibunda Diversion Scheme; and

(iii) by way of contribution to the Krishna river?

(b) Should any directions be given for the vesting of the control and administration in the Tungabhadra Board of —

(i) the Tungabhadra Dam and the Reservoir and the main canal on the left side;

(ii) the Rajolibunda Headworks and the common canals within Mysore State limits; and

(iii) the Power House at Munirabad?

Has the Tribunal any power to give such directions?

(c) Is Andhra Pradesh entitled to a share in the power generated at the Power House at Munirabad?

(d) Is the claim of Andhra Pradesh for a share in the benefits of the power generated at Munirabad Power House and/or for the vesting of the control and administration of the said Power House in the Tungabhadra Board a water dispute within the meaning of the Inter-State Water Disputes Act?

V. Should any directions be given for release of waters —

(a) by Maharashtra for the benefit of Mysore from (i) storage dam at Ajra and

(ii) Koyna Valley Irrigation-cum-Hydro-Electric Project ;

(b) by Mysore for the benefit of Andhra pradesh from (i) Upper Krishna Project ; (ii) Tungabhadra Left Bank Canal Project and (iii) Bhima Project.

VI. Is it possible to divert waters from the river Godavari to the river Krishna ? Should such diversion be made and, if so, when by whom, in what manner and at whose cost ? Is the Tribunal competent to adjudicate on these questions ?

VII. To what relief are the parties entitled ?

Exhibits and Documents.—The parties filed numerous exhibits. Most of the exhibits may be found in bound volumes (APDK volumes I to XII, MRDK Volumes I to XIV, MYDK Volumes I to XXII, CWPC(K) Volumes I to XXXIV, MIP(K) Volumes I and II, PC(K) Volume I, APPK Volumes I to XXXVI, MRPK Volumes I to XXXIII and MYPK Volumes I to XIV.

Witnesses.—The State of Maharashtra called K. K. Framji, Consulting Engineer, as an expert witness on the subjects of model experiments, sub-basin yields, return flows and carryover studies generally and with particular reference to Srisailam and Nagarjunasagar storage reservoirs. The State of Mysore called B. C. Angadi, Chief Engineer, P.W.D., as an expert witness regarding carryover studies in the Krishna Valley. The State of Andhra Pradesh called U. V. Srinivasa Rao, a photographer, to prove certain photographs of the Vijayawada anicut, M. Sivaramaiah, Executive Engineer, to prove the custody of a file and drawing and the conditions of river flow at Vijayawada, M. V. R. Prasad, an assistant, to prove the proper custody of certain documents and drawings relating to the Vijayawada anicut, Y. Jagannadha Rao, retired Assistant Engineer, to prove a photograph and the physical features of the anicut, M. Jaffer Ali, retired Chief Engineer, on the subject of carryover studies particularly with reference to Nagarjunasagar and Srisailam reservoirs and Professor J. V. Rao as an expert witness on the subject of model experiments.

Tour.—The Tribunal visited various places in the Krishna basin to study the local conditions and needs and to see irrigation and power projects, the sites of projects under construction or under contemplation and also certain research stations. Particulars of the tour are given in Appendix "T" to this Report.

Assessors.—When the hearing of the case started, Counsel for all the States jointly requested us not to appoint any assessors. On the 15th September, 1969 ; Counsel for all the States stated that they "desire that the Tribunal need not appoint any assessor or assessors". Again, on the 7th August, 1970, all the States jointly stated that "The States of Andhra Pradesh, Maharashtra, Mysore, Madhya Pradesh and Orissa adhere to their submission that no assessors should be appointed by the Hon'ble Tribunal." Counsel for all the States assured us that their engineers and technical representatives would jointly give us the fullest assistance with regard to all scientific and technical matters. In these circumstances, we refrained from exercising our powers of oppointing assesors under sub-section (3) of section 4 of the Inter-State Water Disputes Act, 1956.

Units of Measurement.—The old records used the British system of units, the new records have mostly used the metric system of units and the data supplied by the parties have used both system of units. As we have to refer to the old as also the new records and the data supplied by the parties, both the systems have to be necessarily used in this judgment. The parties have supplied an agreed conversion table which is included as Appendix "A" to this Report.

Alteration of name of the State of Mysore.—The Mysore State (Alteration of name) Act, 1973 provides for alteration of name of the State of Mysore. Under Section 2 of the Act, with effect from the 1st November, 1973, the State of Mysore shall be known as the State of Karnataka. Section 8 of the Act provides that, in pending legal proceedings, the State of Karnataka shall be deemed to be substituted for the State of Mysore.

CHAPTER III(1)

The Krishna River and River Basin

Part—I—The Krishna River System

THE KRISHNA.—The Krishna is the second largest river in Peninsular India. It rises in the Mahadev range of the Western Ghats near Mahabaleshwar at an altitude of 4,385 ft. above sea level. Rising in the Ghats near the Arabian sea, the Krishna flows through Maharashtra, Mysore and Andhra Pradesh gathering water on its way from innumerable rivers, streams or tributaries and drops into the Bay of Bengal. From its source, the Krishna speeds south-wards skirting the eastern spurs of the hills through the districts of Satara, Sangli and Kolhapur in Maharashtra. After passing the dam sites for the Krishna Project at Dhom and Borkhal, the Krishna receives the waters of the Venna on the right bank, 42 miles from its source at Mahuli near Satara city. Lower down, the river is joined by the Urmodi and the Tarali on the right bank. Flowing past the Khodshi weir from which the Krishna canal takes off, the Krishna is joined on the right bank by the Koyna of which the Wang is a tributary, at mile 85 at an elevation of 2,505 ft. Lower down, the Krishna receives the waters of the Yerla from the left. About 135 miles from its source near Sangli, the Krishna receives on the right bank the waters of the Warna of which the Kadvi is a tributary. Near Kurundvad, at about mile 156, the Krishna receives on its right bank the united waters of the Panchaganga, that is, the Kasari, the Kumbhi, the Bhogavathi, the Tulshi and the Dhamni. At about mile 190, the Krishna is joined on the right bank by the Dudhganga of which the Vedganga is a tributary. About 190 miles from its source and at an altitude of about 1,750 ft., the Krishna enters Mysore State. The river now has left the heavy rainfall zone and turns east. In the run of 186 miles within Maharashtra, the bed fall is 14.06 ft. per mile, the fall up to mile 85 being steeper at the rate of 22.1 ft. per mile.

After flowing for some distance in Mysore, the Krishna is joined by the Agrani on the left bank, the Ghataprabha on the right bank at mile 315 and the Malaprabha on the right bank at mile 337. The junction of the Malaprabha is between Almatti and Narayanpur, the dam sites of the Upper Krishna Project. At Jaldurga falls below Narayanpur, the Krishna drops about 400 ft. in about 3 miles from the table land of the Deccan proper to the alluvial lands of Raichur District. Lower down, the Krishna receives the waters of the Don on the left bank and at about mile 490 the waters of the Bhima on the left bank at an altitude of 1,125 ft. In the run of 300 miles within Mysore, the bed fall is 2.12 ft. per mile.

After the confluence of the Bhima, the Krishna forms the common boundary of Mysore and Andhra Pradesh for 26 miles and then flows through Andhra Pradesh.

About 545 miles from its source, the Krishna receives the waters of the Peddavagu on its left bank, and at about mile 570 near Kurnool the waters of the Tungabhadra on the right bank. A short distance below its junction with the Tungabhadra, the Krishna enters a deep gorge 180 miles long and flows in a north easterly direction in deep rocky channels, with a rapid fall through the spurs of the Nallamalai range and other hills past Srisailam dam site and Nagarjunasagar reservoir before emerging into the plains of the Coromandal coast at Pulichintala, 750 miles from its source at an elevation of 120 ft. Between Kurnool and Pulichintala, the Krishna is joined by the Dindi on its left bank at mile 681, Peddavagu II on its left bank at mile 696, the Hallia at mile 704 and the Musi on its left bank at mile 726. Lower down, the Krishna is joined by the Palleru on the left bank at mile 762 and the Muneru on the left bank at mile 789 before reaching Vijayawada at about mile 815. At Vijayawada the river flows through a gap, three quarters of a mile wide, between lo whills. Beyond this point stretching away on both sides of the river lies a wide alluvial plain known as the Krishna Delta. The Delta is irrigated by canals taking off from the Prakasham Barrage at Vijayawada. After Vijayawada, the river continues in a single channel of great width for another 40 miles when it seconds off to the left a branch known as the Puligadda which forms

(1) Important data with regard to the rivers of the Krishna river system and the Krishna basin were agreed to by the technical representatives and counsel of the States of Maharashtra, Mysore and Andhra Pradesh. The agreed data were incorporated in separate sheets which were exhibited by consent of the parties see MRDK XI, XII, XIII, XIV.

the island of Divi. Thereafter, the main stream continues for another 15 miles and after a total run of 870 miles it breaks up into three months separated from one another by two is lands and joins the Bay of Bengal. In a run of 358 miles within Andhra Pradesh, the bed fall is 3 feet per mile.

During the monsoon season, the Krishna occasionally swells into floods. In the highest known flood on the 7th October, 1903, the recorded discharge at Vijayawada was 10,60,880 cusecs,(2) a quantity more than twice the maximum discharge of the Nil. During the dry weather, the minimum discharge has fallen as low as 100 cusecs. The distinctive features of the greater part of the river are low water level during dry weather, narrow and rocky bed and great flood lift sometimes as much as 100 ft. Increasing upstream utilisation will delay the floods and reduce their intensity. The major tributaries fall into the river in the upper two-thirds of its length.

The rivers Bhima and Tungabhadra, tributaries of the Krishna, are themselves major inter-State rivers.

THE BHIMA.—The Bhima rises in the Western Ghats at Bhimashanker in Poona District of Maharashtra at an altitude of about 3,100 ft. The river flows for a total length of 535 miles through Maharashtra, Mysore and Andhra Pradesh and falls into the Krishna 3 miles above Krishna Railway Station at an altitude of about 1,125 ft.

During its passage through Maharashtra, the Bhima is joined by the Indrayani of which the Kudali is a tributary on the right bank, and the Vel on the left bank. The Bhima receives the waters of the Mulamutha on the right bank near Poona about 85 miles from its source, at an elevation of 1,700 ft. In 85 miles, the bed fall is 16.4 ft. per mile. Lower down, the Bhima is joined by the Ghod of which the Mina, the Kukadi and the Hanga are tributaries, at about mile 103 on the left bank at an elevation of about 1,685 ft. The fall between miles 85 and 103 is 0.82 ft. per mile. The Bhima passes the Ujjani dam site at mile 200 at an elevation of 1,503 ft. The fall between miles 103 and 200 is 1.88 ft. per mile. The river is joined at mile 223 on the right bank by the Nira of which the Karha is a tributary and then by the Man on the right bank. At mile 303, the elevation of the river is about 1,400 ft. For a stretch of 46 miles between miles 303 to 349 the Bhima forms the boundary between Maharashtra and Mysore Within this stretch, the Bhima receives the waters of the Sina on the left bank. The fall between miles 200 and 303 is 1 ft. per mile.

After mile 349, the river Bhima flows through Mysore for 186 miles. In Mysore, the river is joined by the Dodahalla (Nargel), the Bor, the Bori, the Amarja and the Kagna of which the Bennithora and Mullamari are tributaries. In the last 6 miles, the Bhima forms the common boundary between Andhra Pradesh and Mysore. The river joins the Krishna after a run of 535 miles. The fall between miles 303 and 535 is 1.19 ft. per mile.

THE TUNGABHADRA.—The river Tungabhadra is formed by the confluence of two powerful streams—the Tunga on the left and the Bhadra on the right. The two streams rise in the Western Ghats on the hill known as Varaha Parbata at Gangamula within Mysore State at an elevation of about 3,930 ft. to the north of the ridge separating the Krishna and the Cauvery basins. The Malnad region, through which the Tunga and the Bhadra flow, has rich and well developed forest resources. The Tunga runs north-east beyond Sringeri, takes a sharp turn north-west to Tirthahalli and then flows north-east past Ganjnoor, the site of the Tunga anicut near Shimoga town. The Bhadra runs east to the western base of the Baba Budan Range near Mugundi and then north past Lakkavalli and Bhadravathi. The Tunga, after a run of 92 miles, and the Bhadra, after a run of 111 miles, unite at Kudali at an elevation of 2,000 ft. The bed falls of the Tunga and the Bhadra from their sources up to Kudali are 21 ft. and 17.38 ft. per mile respectively.

Below the junction of the Tunga and the Bhadra, the river takes the name Tungabhadra, the fabled Pampa of the Ancients. The river Tungabhadra flows north for some distance, is joined by the Kumudwathi on the left and the Haridra on the right and at mile 100 by the Varada swollen by the waters of the Dharma at an elevation of 1,670 ft. The Tungabhadra then runs north-east, is joined by the Chikka Hagari, and cuts through the Sandur range of hills at Mallapuram where the landscape is dominated by the Tungabhadra dam. The dam site at mile 165 is at an elevation of 1,483.5 ft. The fall between Kudali

(2) The Lower Krishna Project Report 1952 p. 35 (APPK X p. 35); The Nandikonda Project Report 1954 p. 14 APPK I p. 14). On the basis of the Poondi Model experiment, the recorded discharge at Vijayawada on 7-10-1903 was stated to be 11,93,901 cusecs in Kistna Pennar Project Report (1951 Scheme) Vol. I pp. 2, 17 (APPK II pp, 2,17) and in the Khosla Committee Report, p. 13. The discrepancy in the data of the maximum discharge at Vijayawada is discussed in the Report of the COPP Irrigation and Power Team on Nagarjunasagar Project, 1960, pp, 139–145, 155–157.

and mile 165 is 3.13 ft. per mile. From Mallapuram, the river flows swiftly past Hampi through the ruins of the capital city of the mighty Vijayanagar empire, and is joined by the Vedavathi at mile 225. The Tungabhadra forms the border between Mysore and Andhra Pradesh between miles 237 and 273 where it receives the waters of the Maskinala and flows past Rajolibunda anicut. The elevation of the river at mile 237 is 1,120 ft. and at mile 273 is 995 ft. Between miles 165 and 237 the fall is 5.04 ft. per mile and between miles 237 and 273 the fall is 3.47 ft. per mile. In Andhra Pradesh the river is joined by the Hindri and after passing Sunkesala anicut, it flows into the Krishna beyond Kurnool at an elevation of 865 ft. after a run of 330 miles from the confluence of the Tunga and the Bhadra. The fall between miles 273 and 330 is 2.28 ft. per mile. The river receives copious supply from the highly wooded and hilly catchment of the Western Ghats. Though it is classed as a perennial river, the monsoon flows are large, while the summer flows dwindle to 100 or even 50 cusecs.

The Varada drains a large area of the Western Ghats and its chief tributary is the Dharma.

THE GHATAPRABHA.—The Ghataprabha rises from the Western Ghats in Maharashtra at an altitude of 2,900ft., flows eastwards for 37 miles through Ratnagiri and Kolhapur Districts of Maharashtra, forms the border between Maharashtra and Mysore for 5 miles and then enters Mysore. Not far from the Mysore border are Hidkal dam site and the Gokak falls about 200 ft. high. In Mysore, the river flows for 134 miles through Belgaum District past Bagalkot. After a run of 176 miles, the river joins the Krishna on the right bank at Kudli Sangam at an elevation of 1,640 ft., about 10 miles from Almatti. Its principal tributaries are the Tamraparni, the Hiranyakeshi and the Markandeya.

The Tamraparni rising in Maharashtra flows in Maharashtra for 16 miles and after a run of another 16 miles in Mysore joins the Ghataprabha. The Hirayankeshi rising at Amboli village in Ratnagiri District of Maharashtra flows in Maharashtra for 39 miles, forms the boundary between Maharashtra and Mysore for 4 miles and after a run of 12 miles in Mysore joins the Ghataprabha on the left bank. The Markandeya rising in Maharashtra flows in Maharashtra for 5 miles and after a run of 41 miles in Mysore joins the Ghataprabha on the right bank.

THE MALAPRABHA.—The Malaprabha has its source near the Chorla Ghats, a section of the Western Ghats at an elevation of 2,600 ft. about 22 miles south-west of Belgaum in Mysore. The river flows east and then north-east and joins the Krishna at Kapilasangam in Bijapur District at an elevation of 1,600 ft. about 190 miles from its source. Near Manoli, the river passes through the famous Peacock Gorge, the site of the Malaprabha dam now under construction. The principal source of supply of the river is about 20 miles length of the Western Ghats and a small area east of it. Its principal tributaries are the Bennihala, and the Hirehalla.

VEDAVATHI.—The Vedavathi, also called the Hagari, is formed by the union of the streams—the Veda and the Avati originating in the Bababudanagiri range of hills of the Western Ghats in Mysore State. The river flows in Mysore, enters Andhra Pradesh near Bhairavanithippa, re-enters Mysore and after a short run forms the boundary between Andhra Pradesh and Mysore. For the remainder of its course, the river flows in Mysore until it joins the Tungabhadra on the right bank after a run of 243 miles. The river runs for 182 miles in Mysore, 45 miles in Andhra Pradesh and forms the common boundary between Mysore and Andhra Pradesh for 16 miles. Its principal tributaries are the Suvarnamukhi, the Chinna Hagari and the Peddavanka.

THE MUSI.—The Musi rises at an altitude of 2,168 ft. in Medak District of Andhra Pradesh. It flows east, passes through Hyderabad city, is joined by the Chinnamusi Nadi and by the Aleru, turns south, is joined by the Paler and drops into the Krishna near Wazirabad at an elevation of about 200 ft. after a run of 166 miles.

THE PALLERU.—The Palleru, also known as the Palair, rises in Warangal District, flows south, and after a run of 95 miles joins the Krishna.

THE MUNERU.—The Muneru rises in Warangal District, flows south, is joined by the Akeru and the Wyra and drops into the Krishna after a run of 122 miles.

THE KOYNA.—The Koyna in Satara District of Maharashtra is an important right bank tributary of the Krishna river. Rising on the west side of the Mahabaleshwar plateau the river runs in a north to south direction for the first 40 miles and after Helwak village turns east for the remaining 34 miles. The Koyna dam is located up stream of Helwak village at mile 36 of the Koyna river. The Koyna joins the Krishna lower down near Karad town after a run of 74 miles. In the hot weather season, the stream often dries up but the water stands in deep pools through the driest year. During the rains, the river fills up from bank to bank.

Generally.—The heavy rainfall of the Western Ghats is the main source of supply of the Krishna river system. The Krishna basin drains a length of about 428 miles of the Western Ghats, comprising 140 miles in Upper Krishna, 40 miles in Ghataprabha, 20 miles in Malaprabha, 100 miles in Upper Bhima and 128 miles in Tungabhadra sub-basins. The waters of the river system find their outlet in the Bay of Bengal, though they have their main source in the Ghats not far from the Arabian sea.

The Western Ghats run almost parallel to the sea coast at a distance of 50 to 100 miles (80.47 to 160.93 km) from the sea. Precipitous on the western side, they fall away more gradually to the east. The heaviest rainfall occurs on the peak of the ridge, the intensity of the rainfall rapidly decreasing as we go eastwards. The rivers rise in the valleys close to the Ghats which like the ridge of a roof divides the flow into two parts, the smaller portion falling westwards into the Arabian sea and the other flowing through rivers eastwards to the Bay of Bengal.

All the rivers are under the influence of the south-west monsoon. They are entirely rain fed. There is no perennial snow in the mountains to sustain them. Many of the rivers having their source in the Western Ghats begin to rise with the first good rains in June 2nd during high floods occasionally swell into raging torrents. From the middle of October, the flow decreases rapidly. During the dry weather, the discharges are very very low, but as the rivers are fed by underground springs, they are not completely dry.

In the non-Ghat areas, the rivers generally have flat shallow valleys and run in deep channels which have generally approached the base level of erosion. The river courses are stable and well defined.

Inter-State rivers.—The inter-State rivers of the Krishna river system and their successive and common lengths in the States of Maharashtra, Mysore and Andhra Pradesh are given below :—

Sl. No.	Name of River	LENGTH IN MILES				
		Maharash-tra	Mysore	Andhra Pradesh	Common length	Total length
1	2	3	4	5	6	7
1.	Krishna	186	300	358	26	870
2.	Ghataprabha	37	134	..	5	176
3.	Bhima	303	180	..	52	535
4.	Tungabhadra	..	237	57	36	330
5.	Vedavathi (Hagari)	..	182	45	16	243
6.	Vedaganga	41	12	..	2	55
7.	Dudhganga	43	12	..	8	63
8.	Panchaganga	44	..	..	2	46
9.	Agrani	34	26	..	..	60
10.	Don	8	122	..	..	130
11.	Hirehalla (Krishna)	2	22	..	..	24
12.	Markandeya (Ghataprabha)	5	41	..	..	46
13.	Tamraparni (Ghataprabha)	16	16	..	..	32
14.	Hiranyakeshi (Ghataprabha)	39	12	..	4	55
15.	Doddahalla (Bhima)	30	6	..	..	36
16.	Bor Nala (Bhima)	24	18	..	..	42
17.	Bori Nadi (Bhima)	66	14	..	..	76
18.	Amarja (Bhima)	6	39	..	..	45
19.	Kagna (Bhima)	..	44	43	..	87
20.	Bennithora (Kagna)	30	55	..	6	91
21.	Suvarnamukhi	..	46	6	2	54
22.	Chinna Hagari	..	80	18	..	98
23.	Peddavanka (Vedavathi)	..	15	14	..	29
24.	Peddavanka (Tungabhadra)	..	5	12	..	17

1	3	4	5	6	7
25. Garchi Vanka (Tungabhadra)	..	15	20	..	35
26. Gonde Halla (Chinna Hagari)	..	21	3	..	24
27. Doria Halla (Bor Nala)	12	6	..	..	18
28. Katra (Bhima)	5	7	..	..	12
29. Sar Nala (Kagna)	..	23	5	..	28

List of Streame : A table giving the names of the streams in the Krishna river system and their lengths is given in the enclosed map*

Part II—The Krishna River Basin

Locations.—The Krishna basin lies between latitudes 13° 7/N to 19° 20/N and longitudes 73° 22/E to 81° 10/E. It is roughly triangular in shape with its base along the Western Ghats and apex at Vijayawada. The basin extends over an area of 99,980 square miles which is nearly 8 per cent of the total geographical area of India.

Boundaries.—The Western Ghats, 7,000 to 2,000 ft. high running parallel to the coast, form a continuous watershed on the west.

On the north, the Balaghat and the Mahadeo ranges stretching forth from the eastern flank of the Western Ghats and the Anantagiri and other ranges of hills and ridges separate the Krishna basin from the Godavari.

On the eastern side, the broken ranges of the Eastern Ghats dissect the country and proceeding south-west leave broad flat tracts of land between the hills and the sea.

On the south, the Uravakonda and the Mitta-kondala ridges and the Erramalai hills separate the Krishna basin from the Pennar basin and the Nallamalai and the Veligondla hills separate the Krishna basin from other minor basins. Other ridges on the south separate the Krishna basin from the Cauvery basin.

A map of the Krishna basin is appended to this report.

Sub-basins.—The Krishna Basin may be divided (3) into the following sub-basins :—

K. 1. *Upper Krishna.*—The river Krishna from source to the confluence with it of the Dudhganga ; the sub-basin includes the catchment area of the river Krishna and of all its tributaries which fall into the Krishna in this reach up to and including the Dudhganga.

K. 2. *Middle Krishna.*—The river Krishna, from its confluence with the Dudhganga to its confluence with the Bhima; the sub-basin includes the direct catchment of the Krishna in this reach as well as of all its tributaries outfalling in this reach, except that of the Ghataprabha and of the Malaprabha (K. 3 and K. 4 below).

K. 3. *Ghataprabha.*—The entire catchment of the Ghataprabha from source to its confluence with the Krishna, including the catchment area of the Hiranyakeshi, the Markandeya and other tributaries of the Ghataprabha.

K. 4. *Malaprabha.*—The river Malaprabha, from source to its confluence with the Krishna; the sub-basin includes the entire catchment of the Malaprabha and of all its tributaries.

K. 5. *Upper Bhima.*—The river Bhima, from source to the confluence with it of the Sina; the sub-basin includes the catchment area of the Bhima in this reach as well as of all its tributaries which fall into it in this reach including the Sina.

K. 6. *Lower Bhima.*—The lower part of the river Bhima from its confluence with the Sina to the point where the Bhima falls into the Krishna; the sub-basin includes the direct catchment of the lower part of the Bhima as well as of all its tributaries which fall into it in this reach.

K. 7. *Lower Krishna.*—The lower part of the river Krishna from its confluence with the Bhima to the sea; the sub-basin includes the direct catchment of the Krishna in this reach and of all its tributaries which fall into it in this reach, except the area covered by sub-basins K. 8 to K.12 described below.

K. 8. *Tungabhadra.*—This sub-basin includes the entire catchment of the Tungabhadra of all its tributaries, except that of the Vedavathi (K. 9 below).

K. 9. *Vedavathi.*—The river Vedavathi, from source to its out-fall into the Tungabhadra; the sub-basin includes the catchment area of the Vedavathi (also called Hagari in its upper reach) and of all its tributaries.

*See Volume IV of the Report.

(3) Report of the Krishna Godavari Commission, pp. 22–23.

K. 10. *Musi.*—This sub-basin includes the entire catchment of the Musi and of all its tributaries.

K. 11. *Palleru.*—This sub-basin includes the entire catchment of the Palleru and of all its tributaries.

K. 12. *Muneru.*—This sub-basin includes the entire catchment of the Muneru as well as of its tributaries.

Elevation.—A broad view of the elevation of the sub-basins is presented in the following table:—

Sub-basin	Elevation in feet
K-1 Upper Krishna	
Ghat area	4500 to 3000.
Rest	3000 to 2000.
K-2 Middle Krishna	2000 to 1000.
K-3 Ghataprabha	
Ghat area	4500 to 3000.
Rest	3000 to 2000.
K-4 Malaprabha	
Ghat area	3000 to 2000.
Rest	2000 to 1600.
K-5 Upper Bhima	
Ghat area	4500 to 2000.
Rest	2000 to 1000.
K-6 Lower Bhima	2000 to 1000.
K-7 Lower Krishna	
Western Part	2000 to 1000.
Eastern Ghats	3000 to 50.
Delta	50 to 0.
K-8 Tungabhadra	
Ghat area	3900 to 2000.
Rest	2000 to 900.
K-9 Vedavathi	3000 to 1000.
K-10 Musi	2000 to 200.
K-11 Palleru	1000 to 150
K-12 Muneru	1500 to 100.

Topography.—The interior of the basin is a plateau divided into a series of valleys sloping generally towards the east. Belts of country adjoining the Western Ghats in the Upper Krishna, the Upper Bhima, the Ghataprabha, the Malaprabha and the Tungabhadra sub-basins are hilly and highly undulating and covered with dence and evergreen forests; the rest of these sub-basins are flatter and less undulating. The central zone comprising the Middle Krishna, the Lower Bhima and parts of the Malaprabha and the Tungabhadra sub-basins consists of undulating plains and broad flat valleys interspersed with isolated ridges and quaint rocky outcrops of hills. On the eastern side lie the Lower Krishna, the Musi, the Palleru and the Muneru sub-basins comprising the coastal plains, the Eastern Ghats and a series of valleys partly covered with hills and dense forests.

Political divisions, effect of reorganisation of States : Since Independence, there were important political changes affecting the Krishna basin. During 1947-48 the Kolhapur, Deccan and Mysore Agency States having riparian interests in the Krishna basin were merged in the Provinces of Bombay and Madras. Before 1951, the four riparian States of Bombay, Mysore, Hyderabad and Madras had 40,487, 11,636 34,758 and 13,099 sq. miles of territories respectively in the Krishna basin. As from October 1, 1953, the Andhra State was constituted with the territories specified in section 3 of the Andhra State Act, 1953 and thereupon Madras ceased to be a riparian State. As from November 1, 1956 there was a general reorganisation of States and the new States of Andhra Pradesh, Mysore and Bombay were formed with the territories specified in section 3, 7 and 8 of the States Reorganisation Act, 1956 while Hyderabad ceased to be a separate State. As a result of the reorganisation, the three States of Bombay, Mysore and Andhra Pradesh came to possess respectively 26,805, 43,734 and 29,441 sq. miles of territories in the Krishna basin. In 1960, the State of Bombay bifurcated into the States of Maharashtra and Gujarat and all the Krishna basin areas of the old Bombay State fell within the new State of Maharashtra.

Before the reorganisation of States, the Krishna ran for 343 miles in Bombay, formed the common boundary between Bombay and Hyderabad for 5 miles, ran for 222 miles in Hyderabad, formed the boundary between Hyderabad and Madras for 180 miles and ran for another 120 miles in Madras. Now, the Krishna runs for 186 miles in Maharashtra, forms the boundary between Maharashtra and Mysore for 4 miles, runs for 300 miles in Mysore, forms the boundary between Mysore and Andhra Pradesh for 22 miles and then runs for 358 miles in Andhra Pradesh.

As a result of the reorganisation, the Ghataprabha valley which formerly lay within Bombay State exclusively now lies within the States of Maharashtra and Mysore. The Malaprabha valley which lay within Bombay State now lies within Mysore State. The Bhima Valley which formerly lay in the States of Bombay and Hyderabad now lies in the States of Maharashtra, Mysore and Andhra Pradesh. The Tungabhadra valley which lay within Mysore, Bombay, Hyderabad and Madras now lies within the States of Mysore and Andhra Pradesh.

State-wise distribution of sub-basin areas.—The distribution of the sub-basin areas in the three States is given below:—

Sub-basin	Area in square miles				Percentage of Krishna basin
	Maharash-tra	Mysore	Andhra Pradesh	Total	
1	2	3	4	5	6
K-1 Upper Krishna	6,613	326	..	6,939	6.97
K-2 Middle Krishna	536	6,243	..	6,779	6.81
K-3 Ghataprabha	776	2,633	..	3,409	3.43
K-4 Malaprabha	..	4,459	..	4,459	4.48
K-5 Upper Bhima	17,504	282	..	17,786	17.85
K-6 Lower Bhima	1,376	7,130	972	9,478	9.54
K-7 Lower Krishna	..	650	13,298	13,948	13.53
K-8 Tungabhadra	..	14,977	3,489	18,466	18.57
K-9 Vedavathi	..	7,034	2,074	9,108	9.16
K-10 Musi	..	..	4,329	4,329	4.35
K-11 Palleru	..	..	1,260	1,260	1.27
K-12 Muneru	..	..	4,019	4,019	4.04
	26,805	43,734	29,441	99,980	100

District-wise Distribution of sub-basin areas.—The District-wise distribution of the sub-basin areas is given below:—

District	Region	Area within Krishna Basin			Normal Weighted annual rainfall, of District in inches
		Sq. miles	Percentage of total area of District	Sub-basin	
1	2	3	4	5	6
	MAHARASHTRA				
Poona	Western Maharashtra	5,978	99.1	K_5	51.2
Sholapur	—do.—	5,765	99.2	K_5K_6	23.6
Satara	—do.—	4,041	100	K_1K_5	49.2
Sangli (South Satara)	—do.—	3,297	100	$K_1K_2K_5$	29.5
Kolhapur	—do.—	2,929	91.4	K_1K_3	78.7
Ahmednagar	—do.—	2,386	36.2	K_5	25.6
Ratnagiri	—do.—	45	0.9	K_3	118.1
Osmanabad	Marathawada	1,759	31.8	K_5K_6	33.5
Bhir	—do.—	605	14.2	K_5	27.6
		26,805			
	MYSORE				
Chitradurga	Old Mysore	4,185	100	K_8K_9	21.7
Shimoga	—do.—	3,025	74.4	K_8	78.7
Chikmagalar	—do.—	2,397	86	K_8K_9	88.6

1	2	3	4	5	6
Tumkar	Old Mysore	1,520	37.1	K_9	27.6
Hassan	—do.—	509	19.3	K_9	39.4
Bellary	Rayalaseema	3,825	100	K_8K_9	22.6
Bijapur	Bombay Karnataka	6,590	100	$K_2K_3K_4K_5K_6$	23.6
Belgaum	—do.—	4,623	90.8	$K_1K_2K_3K_4$	39.4
Dharwar	—do.—	4,587	86.5	K_4K_8	27.6
[illegible]ara	—do.—	246	6.2	K_8	108.3
Gulbarga	Hyderabad Karnataka	6,348	100	$K_2K_6K_7$	26.6
Raichur	—do.—	5,508	100	$K_7K_8K_2K_4$	23.6
Bidar	—do.—	371	17.9	K_5	35.4
		43,734			
	ANDHRA PRADESH				
Mahboobnagar	Telangana	6,833	100	$K_6K_7K_8K_{10}$	27.6
Nalgonda	—do.—	5,351	100	$K_7K_{10}K_{11}$	28.5
Hyderabad	—do.—	2,860	98.5	$K_6K_7K_{10}$	27.6
Warangal	—do.—	2,530	47.5	$K_{10}K_{11}K_{12}$	41.3
Khammam	—do.—	2,001	43.5	$K_{11}K_{12}K_7$	41.3
Medak	—do—.	578	15.2	K_6K_{10}	33.5
Karimnagar	—do.—	14	0.3	K_{12}	38.4
Kurnool	Andhra Rayalaseema	3,933	42.4	$K_7K_8K_9$	26.6
Guntur	Andhra	2,110	36.4	K_7	32.5
Krishna	Andhra	1,488	42.5	$K_{11}K_{12}K_7$	37.4
Anantpur	Andhra Rayalseema	1,743	23.6	K_9	21.7
		29,441			

Andhra and Telangana regions of Andhra Pradesh.—The distribution of Krishna Basin area in the Andhra and Telangana regions of Andhra Pradesh is given below:—

Name of District	Krishna Drainage Basin area (In sq. Miles)	
	Andhra Region	Telangana Region
1	2	3
Anantapur	1,743	..
Guntur (including areas of present Prakasam District)	2,110	..
Hyderabad	..	2,860
Karimnagar	..	14
Khammam	..	2,001
Krishna	1,488	..
Kurnool (including areas of present Prakasam District)	3,933	..
Mahboobnagar	..	6,833
Medak	..	578
Nalgonda	..	5,351
Warangal	..	2,530
TOTAL	9,274	20,167
	29,441 sq. miles.	

Basin population.— On the basin of the 1971 census and the percentages of the area of each district within the basin to the district as a whole, the total population in the basin is about 38.71 million. The State-wise distribution is shown in the Table below:—

Population in the Krishna Basin—Statewise:

Sl. No.	State	Population
1.	Andhra Pradesh	12.06 Million
2.	Maharashtra	12.15 Million
3.	Mysore	14.05 Million
		38.71 Million

There are sixteen main cities in the basin which have a population of more than one lakh each. They are Hyderabad, Vijayawada and Kurnool in Andhra Pradesh; Ahmednagar, Poona, Sholapur, Sangli and Kolhapur in Maharashtra and Hubli-Dharwar, Davangere, Bijapur, Shimoga, Bhadrawathi, Bellary, Gulbarga and Belgaum in Mysore. The average density of population in the basin is 149 persons per sq. km. The density varies from region to region within the basin. The coastal plain is generally densely populated while the hilly areas have a relatively low density.

In 1971, the most densely populated district of Hyderabad had 362 persons per sq. km. while the district of North Kanara with 83 persons per sq. km. stood at the other extreme.

75.8 per cent of the population in the basin live in rural areas and the balance of 24.2 per cent in cities and towns. The working force constitutes about 36.7 per dent of the population. Nearly 37.6 per cent of the working force is engaged as cultivators, 30.5 per cent as agricultural labourers and the balance 31.9 per cent are employed in mining, manufacturing and tertiary activities. Forests and agriculture are the mainstay of the people.

Hydrologic cycle.—The constant circulation of water from ocean to air and back again to the ocean with temporary storages in life forms, fresh water bodies and ground water is called the hydrologic cycle or the water cycle. The water cycle is an intricate combination of evaporation, transpiration, air mass movement, condensation, rainfall, percolation, ground water storage and movement, and run-off. The cycle has no beginning or end.

Rainfall.—Rainfall is the source of all water within the Krishna basin. The dominant natural factor that affects basically the life and economy of the people in the Krishna basin is the rainfall and its regional and seasonal distribution, amount and variability. The major part of the rainfall is received during the south-west monsoon season.

South-west monsoon season.—At the end of May, when the weather is at its hottest in India, the trade winds from the south of the equator blow northwards into the Bay of Bengal and the Arabian Sea; and are deflected inland as south-westerly winds which give rise to the cool and humid south-west monsoon. This humid current called the south-west monsoon is frequently ushered in by cyclonic storms either in the Bay of Bengal or the Arabian Sea with the associated heavy rainfall.

The south-west monsoon bursts on the Kerala coast at the beginning of June, gradually extends northwards and spreads over most of India by the end of June.

The Arabian Sea current strikes the west coast of India where it is obstructed by the continuous barrier of the Western Ghats 2,000 to 7,000 ft. high. The mountain barrier, by forcing ascent and consequent expansion and cooling of the moisture-bearing winds, causes heavy precipitation in the coastal districts, on the Ghats and within a belt of a maximum width of 30 to 40 miles on their leeward side. From this region of heavy rainfall and evergreen and semi-evergreen forests, the monsoon current bereft of most of its moisture advances eastwards over an extensive rainshadow region of sparse rainfall.

The south-west monsoon season during June to September contributes about 73 per cent of the annual rainfall of the Krishna basin. Agriculture depends mainly on the amount and distribution of rainfall during this season. The months of June and July are crucial for Kharif crops. The normal date of onset of the south-west monsoon in the Krishna basin is between the 1st and the 10th of June. The arrival of the monsoon is a gradual process with a period of transition spread over a week or more and is marked by a sudden increase in rainfall. During the monsoon season, heavy to moderate rains alternate with breaks when there is little or no rain. The strength of the monsoon current increases from June to July, remains more or less steady in August, and begins to weaken in the month of September. The normal date of withdrawal of south-west monsoon in the Krishna basin is between the 1st October and 15th November.

The character of the monsoon season is determined by the dates of onset and cessation of the monsoon, the monthly and seasonal rainfall, the intensity of the rain, the number of rainy days and the frequency and duration of dry spells.

Other rainy seasons.—The other rainy seasons are not as well defined and as well spread as the south-west monsoon season.

By the middle of October, the retreating south-east monsoon curves round under the influence of the belt of low pressure in the centre of the Bay of Bengal and is deflected towards the Peninsula from the north-east. This current which is usually called the north-east monsoon causes occasional showers, the amount of rainfal decreasing from the coast towards the interior. During October and November, cyclonic storms from the Bay of Bengal bring heavy rain to the Coromondal coast. The season October to December contributes about 17 per cent of the normal annual rainfall of the Krishna basin.

There is little rain during the winter season in January and February. During the hot weather season from March to May, particularly during April and May, local thnuderstorms bring welcome showers in some regions. The winter and hot weather seasons contribute about 1 per cent and 9 per cent respectively of the normal annual rainfall of the Krishna basin.

Water year.—A water year is a continuous twelve month period during which a complete annual stream flow cycle occurs and which is selected for water accounts and data of steam flow(4). Water year usually starts when ground and surface storage are both reduced to the minimum(5). The parties agree that in the Krishna basin, for all purposes, the water year commences from the 1st of June and ends on the 31st of May of every year.

Sub-basin-wise rainfall.—The seasonal and annual weighted rainfall in different sub-basins are shown in the following table:—

SEASONAL AND ANNUAL WEIGHTED AVERAGE RAINFALL

Sub-basin	Rainfall (millimetres) Jan.—Feb.	Mar.—May.	June—Sept.	Oct.—Dec.	Annual	Regional variation of annual rainfall (millimetres)
1	2	3	4	5	6	7
Upper Krishna K.1	5	65	1,286	152	1,508	In large part 3000 to 1000, in Western end more than 3000 and on the east of the line joining Kolhapur and Satara 1000 to 600.
Middle Krishna K.2	7	62	366	130	565	600 and less.
Ghataprabha K.3	5	92	671	153	921	Ghat area 3500 to 1000 non-Ghat area less than 600.
Malaprabha K.4	4	93	431	147	675	Ghat area 1000 or more; Rest less than 700 with some area less than 600.
Upper Bhima K.5	8	36	527	105	676	Western zone Ghat area 3000 to 1000 Middle Zone 400 to 600 Eastern zone 600 to 800.
Lower Bhima K.6	12	51	499	99	661	600 to 800, with some area less than 600.
Lower Krishna K.7	12	60	508	141	721	Western end 600 Eastern end 1000.
Tungabhadra K.8	8	95	622	159	884	4000 to 500.
Vedavathi K.9	9	103	288	168	568	700 to 500 and less.
Musi K.10	14	65	546	124	749	700 to 830
Palleru K.11	14	55	605	136	810	770 to 880
Muneru K.12	19	78	723	134	954	800 to 1050
Krishna basin	9	69	570	136	784	

(4) See Multi-lingual Dictionary on Irrigation and Drainage published by the International Commission on Irrigation and Drainage 1967, p. 70. Serial No. 1137; MRG VI, pp. 14, 42.

(5) Ven Te Chow, Hand book of Applied Hydrology (1967), pp. 8-12, 15-41.

Rainfall distribution.—Rainfall distribution in the basin is mainly influenced by the physical features of the terrain. The Western Ghats and a small belt of adjoining country of varying width receive the highest amount of rainfall. A large area to the east of the Western Ghats is a rainshadow region having rainfall below 600 mm. East of the rainshadow zone, the rainfall gradually rises and increases to about 1,050 mm.

Variability of rainfall.—The monthly seasonal and annual rainfall of the Krishna basin varies from year to year. The co-efficient of variability (that is, standard deviation x 100 arithmatic mean) is an important statistical measure of variation. The available material(6) indicates that the co-efficient of variability of the annual rainfall ranges from 20 to 35 per cent. For season June to September the range is between 20 to over 40 per cent, for season October to December between 50 to about 100 per cent, and for season March to May between 50 to 100 per cent. In the eastern third of the basin, the co-efficient of variability is between 20 to 30 per cent during June to September.

The following table shows the areas (in square miles) of the three States in the Krishna basin for different ranges of co-efficient of variability of rainfall :—

1	2	Mysore 3	Maharashtra 4	Andhra Pradesh 5
Annual	More than 20%	40,045	25,777	29,441
	More than 25%	33,504	20,986	12,171
	More than 30%	12,903	11,309	947
June-Sept.	More than 20%	43,057	26,012	29,441
	More than 30%	29,635	20,383	12,367
	More than 40%	5,565	1,606	1,340
Oct.-Dec.	More than 50%	41,528	26,800	29,441
	More than 60%	30,696	26,007	27,851
	More than 80%	1,248	5,708	Nil
	More than 100%	Nil	723	Nil

The monthly rainfall variation is generally higher than the seasonal variation. Low total rainfall and high variability go hand in hand.

Variability of rainfall creates the greatest drought hazards. Except in arsas of abundant rainfall or assured irrigation, large deficiencies in the normal rainfall are likely to cause partial or complete failure of crops. Within the Krishna basin, there are exceptionally insecure regions of low rainfall and large variability of precipitation, where, at frequent intervals, drought causing partial or complete failure of crops and scarcity conditions prevail.

Climate.—The Krishna basin has a monsoon tropical climate.

Temperature.—The mean annual temperature of the basin varies from 24°C (75°F) in the Western Ghats to 29.4°C (85°F) on the east-coast. The range of mean daily temperature during representative winter, summer, monsoon and post-monsoon months is shown in the following table :—

	Minimum	Maximum
January	15°C (59°F) to 18°C (64°F)	30°C (86°F)
April	22°C (72°F) to 26°C (79°F)	35°C (95°F) to 40°C(104°F)
July	20°C (68°F) to 26°C (79°F)	27°C (81°F) to 33°C (91°F)
October	20°C (68°F) to 23°C (74°F)	30°C (86°F)

The Ghat areas, because of their high altitude, have a comparatively lower temperature. The non-Ghat areas are mostly regions of hot summers and warm winters. The range of daily maximum and minimum temperature is less near the coastal regions because of their proximity to the sea. During summer months, the central regions have the highest maximum daily temperature.

Humidity.—Except during the rainy season, humidity is low in most parts of the basin.

Evaporation.—In most parts of the Krishna basin, because of the high temperature and low humidity, evaporation from a free water surface, such as, river channels, canals and reservoirs is very high. Some idea of the mean potential evaporation, that is, evaporation if a free water surface were available, may

(6) Rainfall variability of Krishna and Godavari Basins issued by the Indian Meteorological Department, March, 1970.

be gathered from the following figures given in the Krishna Godavari Commission Report :—

Name of Sub-basin	Mean Annual potential evaporation in millimetres		
	Maximum	Minimum	Mean
1	2	3	4
K1 Upper Krishna . .	2,540	1,088	1,814
K2 Middle Krishna . .	3,493	2,223	2,858
K3 Ghataprabha . .	3,015	1,088	2,052
K4 Malaprabha . . .	3,175	1,088	2,540
K5 Upper Bhima . .	3,810	2,223	3,017
K6 Lower Bhima . .	..	..	3,810
K7 Lower Krishna . .	..	..	2,540
K8 Tungabhadra . .	..	..	2,540
K9 Vedavathi . . .	..	..	2,540
K10 Musi	..	..	2,800
K11 Palleru . . .	..	..	2,540
K12 Muneru . . .	..	..	2,235

Except during the monsoon season, June to September, the normal potential evaporation is in excess of the normal rainfall and for some stations, such as, Sholapur, Gulbarga, Raichur and Kurnool this excess persists during the monsoon season.

Evapo-transpiration.—Equally high is the evapo-transpiration, that is, the quantity of water transpired by plants and evaporated from soils (7). The annual potential evapo-transpiration, that is, the annual evapo-transpiration from an extensive vegetative cover if an unlimited supply of water were available, ranges from 1,600 to 1,800 millimetres in the Krishna basin. In some parts of the basin, it is even more than 1,800 millimetres. These figures give a fair idea of the water need of plants. In most parts of the basin, except during the monsoon season, the monthly precipitation is less than the monthly potential evapo-transpiration and there is moisture deficiency. As and when the soil moisture within the root zone of plants is depleted, there is need for irrigation to sustain plant life.

Adequacy of rainfall for meeting the water needs of plants is judged by comparing the rainfall received with the potential evapo-transpiration, taking also into consideration the soil characteristics of the area, particularly its water holding capacity.

Arid and semi-arid regions.—Arid and semi-arid regions are areas where rainfall cannot satisfy a large portion of the evapo-transpiration needs. East of the Western Ghats, there are extensive semi-arid regions and regions where conditions close to aridity prevail. All arid and semi-arid regions are susceptible to drought(8).

The Irrigation Commission(9) 1972 observed that arid regions are areas where rainfall meets one-third or less of evapo-transpiration needs and semi-arid regions are areas where rainfall meets one-third to two-third of evapo-transpiration needs.

Scarcity areas.—The State Governments suggest different tests for defining scarcity areas. Maharashtra considers that scarcity areas are areas having (i) annual rainfall of less than 19.7 inches (500 mm), (ii) 75 per cent dependable rainfall of less than 5 to 6 inches during September-October, (iii) co-efficient of variability of annual rainfall of more than 30 per cent, (iv) co-efficient of variability of September-October rainfall of more than 45 per cent(10).

Mysore suggests that scarcity areas are areas which (i) receive less than 15.8 inches (400 mm) normal rainfall during June-September, (ii) less than 5.9 inches (150 mm) normal rainfall during October-December, (iii) have co-efficient of variability of June-September, rainfall of more than 3 per cent, (iv) are arid and semi-arid areas according to a map prepared by the Central Arid Zone Research Institute Jodhpur, (v) have less than 20 or 30 rainy days in June-September and/or (vi) have high suspensions of land revenue(11).

Andhra Pradesh suggests that scarcity areas are areas which have less than 30 inches of average annual rainfall with high frequency of deficiency of annual rainfall from average annual rainfall(12).

(7) The rate of evapo-transpiration is controlled by meteorological and radiation factors. See Henry Olivier, Water Resources Engineering, 1972, pp. 25-31.

(8) Report of the Indian Irrigation Commission 1972 Vol. I, pp. 163-165 and Fig. 8.2; Map prepared by the Central Arid Zone Research Institute Jodhpur showing aridity index and moisture index in the Krishna basin and an Article in the Journal of the Indian Society of Agricultural Statistics Vol. XIX June 1967; MYDK XX, pp. 13-25; An Article by R.D. Dhir published in Reviews of Research on Arid Zone Hydrology. UNESCO 1953, p. 96 MY DK XVIII pp. 64-65.

(9) Report of the Irrigation Commission 1972 Vol. I p. 164, Fig. 8.2.

(10) MRK I pp. 156-160; MRK III p 184; MRK IV pp. 7,26.

(11) MYK I pp. 23—28 MYK III p. , MYK IV p. 37.

(12) APK I p. 113

All the States rely on the history of the occurrence of scarcity and famines in areas within their respective territories.

The underlying assumption of all these tests is that scarcity areas are areas of low and uncertain rainfall, which frequently suffer from droughts causing partial or complete failure of crops and where consequently distress and scarcity conditions prevail at frequent intervals. We may observe that drought or scarcity areas are areas where large deficiencies of annual rainfall occur frequently.

The materials on the record(13) indicate that drought and scarcity conditions have frequently occurred in extensive areas within the Krishna basin and particularly in several Taluks in the following districts :—

In Maharashtra .	Poona, Sholapur, Satara, Sangli, Ahmednagar, Osmanabad and Bhir districts.
In Mysore . .	Bijapur, Bellary, Raichur, Dharwar, Gulbarga, Chitradurga and Tumkur districts.
In Andhra Pradesh .	Mahboobnagar, Nalgonda, Hyderabad, Kurnool and Anantpur districts.

The Indian Irrigation Commission(14) 1901 said that a rainfall deficiency of 25 per cent would be likely to cause some injury and a deficiency of 40 per cent would generally cause severe injury, and that the former may be called a dry year and the later a year of severe drought.

(13) Report of the Indian Irrigation Commission 1901—1903, Part I p. 17; Report of the Krishna Godavari Commission, pp. 33, 101—108; Report of the Fact-Finding Committee for survey of scarcity areas in Bombay State 1960, Vol. I pp. 13-14; APDK X pp. 1-3; Report of the Committee to go into the availability of Krishna basin for utilisation in Mysore State; MYDK II pp. 420—457.

Report of the Central Team visiting drought affected areas of Mysore 1968 Planning Commission, MYDK XVIII pp. 35—51.

Report of Central Team visiting drought affected areas of Andhra Pradesh 1968 Planning Commission, APDK II pp. 30—44.

Report of a tour of scarcity areas in Mysore by a team of officers led by S.V. Ramamurthy, Adviser, Planning Commission, MYDK XVIII pp. 2—3.

Scheme for development of backward areas in Mysore State 1964, MYDK XVIII p. 1.
Mysore State Gazetteer, Gulbarga district 1966 p. 136, MYDK IV p. 39.
Mysore State Gazetteer, Chitradurga district 1967 p. 151, MYDK IV p. 40.
Bombay State Gazetteer Dharwar District 1955 pp. 356—359, MYDK IV pp. 41—46.
Mysore State Gazetteer Tumkur District 1969 pp. 167—168, MYDK IV p. 47.
Mysore State Gazetteer, Bijapur District p. 164, MYDK XVIII pp. 58—61.
Statistical atlas of Bombay State (Provincial Part) 1950 pp. 131—133, 145—147 published by the Bureau of Economics and Statistics, Bombay Government, MYDK IV pp. 19—29.

Census of India 1951, Vol. I Parts IA and IB pp. 267—270 MYDK XVIII pp. 4—9.

Imperial Gazetteer of India—Provincial series Hyderabad State 1909 pp. 48—49, 246—275, MYDK IV pp. 17—18 MYDK III pp. 2—4.

Gazetteer of Bellary district pp. 121—148, MYDK IV. pp. 48—50.

Gazetteer of Bombay Presidency (Vol. XXIIIB) Bijapur and Jath Table XIII Famines, MYK I pp. 75—76 Famine Manual MYK I pp. 72—74.

H.F. Beale, Investigation report on protective irrigation works 1910 pp. 297, 315, MYDK IV pp. 64—65.

H.F. Beale Report on the surveys for protective irrigation works in the Deccan 1910 pp. 36, 37, MYDK IV pp. 66—69.

Journal of Indian Society of Agricultural Statistics Vol. XIX June 1967 No. 1 Growth and Inability in Indian Agriculture by

S.R. Sen pp. 7—8, 12, 22, 23, 27, MYDK XX pp. 15—26.

Kanitkar, Sirur and Gokhale, Dry Farming in India pp. 8, 17, MYDK IV p. 51, MYDK XVIII p. 55.

(14) Report of the Indian Irrigation Commission 1901—1903 Part I p.4.

The Irrigation Commission[15] 1972 observed:—

> "We had also requested the India Meteorological Department to assist us in laying down criteria for the identification of drought areas. The Department has defined drought as a situation occurring in any area when the annual rainfall is less than 75 per cent of the normal. It has defined 'moderate drought' as obtaining where the rainfall deficit is between 25 to 50 per cent and 'severe drought' where the deficiency is above 50 per cent. Areas where drought has occurred, as defined above, in 20 per cent of the years examined, are considered 'drought areas', and where it has occurred in more than 40 per cent of years, as 'chronic drought areas'."

Accepting the definition of drought given by the India Meteorological Department, the Irrigation Commission concluded that the drought areas were areas having 20 per cent probability of rainfall departures of more than (—) 25 per cent from the normal and chronically drought affected areas were areas having 40 per cent probability of rainfall departure of more than (—) 25 per cent from the normal. On this basis, the Irrigation Commission identified extensive areas in Maharashtra, Mysore and Andhra Pradesh as drought areas and some areas as chronically drought affected areas. Most of the areas susceptible to drought fall within the arid and semi-arid zones.

Irrigation, to the extent it can be provided, will afford protection to the scarcity areas. Schemes for irrigation of such areas should receive special attention[16]. One of the objectives of the Fourth Plan in regard to new irrigation projects is the choice, wherever practicable, of those areas which are relatively deficient in assured rainfall as well as irrigation[17].

Water demands in the Krishna basin.—A demand for beneficial use of water arises out of almost every phase of human activity. Some demands depending on flow uses do not involve removing the water from its natural location. These include such activities as conservation of fish and wildlife, swimming and recreational activities, navigation on rivers and lakes and the disposal of waste. These are non-withdrawal uses. Under certain conditions, hydro-power developments are in this category. There are some demands for non-withdrawal uses in the Krishna basin.

Withdrawal uses of water, which involve continual removal of water from its natural location either permanently or temporarily, include irrigation, hydro-power involving diversion of water to a different watershed, nevigation on canals, industrial use, public water supplies, domestic and stockwatering use. There are demands for all these categories of withdrawal uses in the Krishna basin. The largest demands are for irrigation and for hydro-power involving diversion out of the basin.

We have provided in our final order that beneficial use shall include any use made by any State of the waters of the river Krishna for domestic, municipal, irrigation, industrial, production of power, navigation, pisciculture, wild life protection and recreation purposes.

Technique of development of river resources in the Krishna basin.—All the rivers of the Krishna river system have one common feature. During the monsoon, they pass enormous volumes of water part of which runs waste of the sea. After the monsoon, their flow is too meagre for planned agriculture. Such being the pattern of inflows, provision of regulating storages to even out the wide seasonal fluctuation becomes the key techniques of development of river resources. The water stored during the rains is let out from time to time according to the requirements of irrigation and other beneficial uses. However, evaporation losses from the free water surface of storage reservoirs are very high, particularly if the water spread is large. Some of the earlier irrigation works derive their supplies from diversion of river water into canals.

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(15) Report of the Irrigation Commission 1972, Vol. I pp. 160, 164-166 Fig. 8.2.

(16) See Circular letter No. N.R.4 (17) (58) dated 2-12-1958 from the Planning Commission to all State Governments; Indian Irrigation Commission 1972, Vol. I, pp. 259.

(17) Fourth Five Year Plan, p. 248.

Irrigation Development.—The source-wise irrigation in the Krishna basin in the three States during the year 1969-70 is given in the following table:—

Sl. No.	Source of Irrigation	Area irrigated in '000 hectares			Total area irrigated
		Maharashtra	Mysore	Andhra Pradesh	
1	2	3	4	5	6
1.	Canals	134.8	252.6	352.6	740.0
2.	Tanks	6.5	169.6	196.1	372.2
3.	Tube wells	..	..	6.3	6.3
4.	Wells	295.7	135.7	107.3	539.7
5.	Other sources	54.0	36.1	20.9	111.0
	Total	491.0	595.0	683.2	1769.2

Classification of irrigation projects.—For purposes of planning and administration it is usual to classify projects costing more than Rs. 50 million each as major, irrigation schemes costing between Rs. 2.5 million and Rs. 50 million as medium and works costing up to Rs. 2.5 million in the plains and Rs. 3 million in the hilly regions as minor.

For purposes of this case, it is convenient to classify projects utilising more than 3 T.M.C. of water annually as major, projects utilising 1 to 3 T.M.C. of water annually as medium, works and projects (including small tanks and diversions but excluding wells) utilising less than 1 T.M.C. annually of water as minor.

Major Irrigation Projects using more than 10 T.M.C. of water annually.—Major Irrigation Projects in the Krishna basin in operation and under construction using more than 10 T.M.C. of water annually, are given below:—

Name of Project	Year of commencement of operation	Type	Sub-basin	State benefited
1. Nira System Ex Vir	1892	Storage cum diversion	K5	Maharashtra
(i) Left Bank Canal				
(ii) Right Bank Canal	1928	,,	,,	,,
2. Vir Dam Project	1962	Storage	,,	,,
3. Bhima Project	Under construction	,,	,,	,,
4. Kukadi Project	Under construction	,,	K-5	,,
5. Khadakwasla Project Stage I	1970	,,	,,	,,
6. Ghod Project	1958	,,	,,	,,
7. Krishna Project	Under construction	,,	K-1	,,
8. Warna Project	Under construction	,,	,,	,,
9. Radhanagari Project	1952	,,	,,	,,
10. Upper Krishna Project Stage I	Under construction	,,	K-2	Mysore
11. Ghataprabha	1951	Diversion	K-3	,,
Stage I				
Stage II	Under construction	Storage	,,	,,

Sl. No.	Name of Project	Year of commencement of operation	Type	Sub-basin	State benefited
12.	Malaprabha Project	1972	Storage	K-4	Mysore
13.	Bhadra Project	1957	,,	K-8	,,
14.	Tungabhadra Project Low Level Canal		,,	,,	Mysore and Andhra Pradesh
	Right Side	1953			
	Left Side	1953			Mysore
15.	Tungabhadra Right Bank High Level Canal Stages I & II	1967	,,	,,	Mysore and Andhra Pradesh
16.	Rajolibunda Diversion Scheme	—	Diversion	,,	,,
17.	Kurnool Cuddapah Canal	1866	,,	,,	Andhra Pradesh
	Improvements	1962			
18.	Nagarjunasagar Project	1967	Storage	K-7	,,
19.	Krishna Delta System	1855	Diversion	,,	,,
20.	Tunga Anicut	1955	,,	K-8	Mysore

Lining of canals.—In Maharashtra, all the canals in the Krishna basin (except the first 12 miles of Khadakwasla Project) are unlined.

In Mysore, it is proposed to line the main canal, branches and distributaries (up to 10 cusecs capacity) of the Upper Krishna Project and the main canal and branches of the Malaprabha Project. The main canals of the Tungabhadra Project Left Bank Low Level Canal, the Tungabhadra Project High Level Canal, the Tungabhadra Project Right Bank Low Level Canal up to mile 14/0 (Power canal portion) and the Rajolibunda Diversion Scheme have been lined. All other canals in the Krishna basin are unlined. It is stated on behalf of Mysore that the main canal and branches of most of the proposed major projects will be lined.

In Andhra Pradesh, the main canals of the Kurnool Cuddapah Canal up to mile 76, the Rajolibunda Diversion Scheme and the Tungabhadra Project Right Bank High Level Canal from Mysore-Andhra Pradesh border up to mile 116/0 in Andhra Pradesh are lined. The Nagarjunasagar Project Left Canal up to mile 85 is to be lined as per sanctioned estimate. All other canals in the basin are unlined.

Major irrigation projects using 3 to 10 T.M.C. of water annually.—Major irrigation projects in the Krishna basin using 3 to 10 T.M.C. of water annually are Mutha System Ex-Khadakwasla in K5, Koilsagar, Dindi and Guntur channel in K7, Bhadra Anicut in K8, Bhairavanitippa and Vanivilas Sagar in K9, Musi in K10, Palair in K11, Muniyern and Wyra in K12.

Medium irrigation projects.—Medium irrigation projects in the Krishna basin using 1 to 3 T.M.C. of water annually are Krishna Canal and Tulshi Project in K1, Mhaswad, Mangi tank, Ekruk tank and Khasapur tank in K5, Kurnoor, Chandramapalli and Kotepallivaga in K6, Okachettivaga and Vaikunthapuram Pumping Scheme in K7, Ambligola, Anjanpur Reservoir, Dharma Canal System and Dharma Project, Hagari Bommanhalli and Gajuladinne in K8, Pakhal Lake and Lankasagar in K12.

Small diversions.—Where topographical conditions are favourable, anicuts are built across streams and small canals are taken for a short distance. Some diversion schemes were constructed centuries ago. The Vijayanagar channels previously known as pre-Mughal channels in Bellary and Raichur districts of Mysore and Kurnool District of Andhra Pradesh were constructed by the powerful Vijayanagar Kings during 1500 A. D. to 1560 A.D.

Tanks.—In Andhra Pradesh and Mysore, irrigation from storage tanks has been practised from the earliest times down to this day. The storage tanks are constructed by forming earthern bunds across valleys and small streams. The tanks have shallow depth and comparatively large waterspread and there is considerable loss of water from evaporation. On some streams there are groups of tanks where the surplus water of an upper tank and the drainage of its wet cultivation are caught and used in a lower tank. There are thousands of tanks in Andhra Pradesh and Mysore. There are tanks in Maharashtra also.

Irrigation from wells.—From the information supplied by the parties, it appears the areas irrigated from wells in the Krishna basin within Maharashtra, Mysore and Andhra Pradesh were as follows:—

Year	Name of State	Net area irrigated by wells in hectares
1969-70	Maharashtra	2,95,920
1969-70	Mysore	1,36,670
1969-70	Andhra Pradesh	1,07,300

Flood Control.—There is no separate scheme for flood control in operation.

Power Development.—The following hydro-electric power projects based on westward diversion of water are in operation :—

Sl. No.	Name of Project	Installed capacity M.W.	Sub-basin	State benefited
1	2	3	4	5
1.	Koyna Hydro-Electric Project Stages I & II.	540	K1	Maharashtra
2.	Tata Hydro-Power Supply Scheme (Khopoli Power House)	70.0	K5	,,
3.	Andhra Valley Power Supply Scheme (Bhivpuri Power House)	72.0	K5	,,
4.	Tata Power Scheme Mulshi Dam (Bhira Power House)	132.0	K5	,,

The following hydro-electric projects involving use of tail race waters of existing westward diversion schemes are under construction :—

Sl. No.	Name of Project	Installed capacity M.W.	Sub-basin	State benefited
1	2	3	4	5
1.	Koyna Hydro Stage III	320	K1	Maharashtra
2.	Bhira tail race development	80	K5	,,

Other hydro-electric power projects in operation are as follows :—

Sl. No.	Name of Project	Installed capacity M.W.	Sub-basin	State benefited
1	2	3	4	5
1.	Tungabhadra Project Dam Power House on right side.	36	K8	Andhra Pradesh and Mysore in the ratio of 4:1 Andhra-
2.	Tungabhadra Project Power House on right canal at Hampi	36	K8	Pradesh and Mysore in the ratio of 4:1
*3.	Tungabhadra Project Dam Power House on left side at Munirabad.	27	,,	Mysore
4.	Bhadra Hydro-electric Project	33.2	,,	Mysore
5.	Gokak Mills Power House	2.6	K3	Mysore
6.	Radhanagari Hydro Scheme	4.8	K1	Maharashtra

*Note: In item 3 Andhra Pradesh claims a share. This claim is disputed by Mysore and will be dealt with separately.

Other hydro-electric power projects under construetion are as follows :—

Sl. No.	Name of Project	Installed capacity M. W.	Sub-basin	State benefited
1	2	3	4	5
1.	Bhatgar & Vir Hydro-electric Project			
	(i) Bhatgar Dam Power House	16	K5	Maharashtra
	(ii) Vir Dam Power House	9	K5	Maharashtra
2.	Srisailam Hydro-electric Project	440	K7	Andhra Pradesh
3.	Nagarjunasagar Pumped Storage Hydro-electric Scheme . .	100	K7	Andhra Pradesh

Municipal and domestic water supply. —Open wells and bore wells are the main sources of water supply in villages. Since independence, rural water supply has received special attention by its inclusion under various programmes in the Five Year Plans. Most of the major cities and towns have some provision of water supply. The more important municipal water supply schemes in operation in the Krishna basin are—

Name of scheme	Sub-basin	State benefited
Sholapur city water supply scheme	K5	Maharashtra
Water supply to twin cities of Hyderabad and Secunderabad .	K10	Andhra Pradesh
Mutha system Ex-Khadakwasla	K5	Maharashtra

The Mutha system Ex-Khadakwasla supplies water to Poona city, Poona and Kirkee Cantonment areas.

Navigation.—The Krishna river is navigable from sea to 22 miles upstream of Prakasham barrage throughout the year and up to about 60 miles upstream of the barrage during the monsoon months. On account of their rocky and shallow beds and their rapid course during the monsoon months, the other rivers and the upper reaches of the Krishna are not navigable.

There are navigation facilities in the delta canals below Vijayawada. The canals are open to navigation for nine to ten months in the year.

A network of canals connects the Krishna and Godavari Rivers to the sea ports of Kakinada and Machilipatnam.

The Krishna Delta Elluru Canal takes off from Vijayawada and runs North to Elluru where it joins the Godavari West Canal which takes off from the anicut across the Godavari at Dowlaishwaram. From Dowlaishwaram, the Godavari Eastern Canal takes off and goes up to Kakinda port. From Vijayawada, another canal called the Bandar Canal takes off and connects Vijiyiwada with Machilipatnam port.

The Krishna Western Main Canal takes off from the Vijayawada anicut on the Sithanagaram side, is continued under the name of Kommamur Canal and joins the Buckingham Canal which in its turn stretches to the south of Madras city.

Except parts of the Kurnool Cuddapah Canal, the other canals in the Krishna basin are not navigable.

Some features of Krishna basin (18).

The culturable area, the net and gross sown area and the net and gross irrigated area in the Krishna

(18) Statistical Abstract of Mysore 1970-71, pp, 17-19, 23, 39, 42; Season and Crop Report of Maharashta State 1969-70, pp. 40—43, 46; Season and Crop Report of Andhra Pradesh for the agricultural year 1969-70, pp. 105; Statistical Abstract of Andhra Pradesh 1971, pp. 54-55.

basin in the three States during 1969-70 are given in the following table :

Item	Mysore	Maharashtra	Andhra Pradesh	Total of Krishna drainage Basin
1	2	3	4	5
	(Area in 1000 hectares)			
(i) Culturable area (1969-70)	9,270	5,749	5,429	20,448
(ii) Net area sown (1969-70)	7,247	4,857	3,706	15,810
(iii) Gross sown area (1969-70)	7,498	5,101	4,230	16,829
(iv) Net area irrigated (1969-70) . . .	595	491	683	1,769
(v) Gross area irrigated (1969-70) . . .	698	571	960	2,229

Soils.—The four major soil groups in India are (1) alluvial soils, (2) black soils (regur), (3) red soils and (4) laterite and lateritic soils. In the Krishna basin, deep, medium and shallow black soils, red loamy and red sandy soils and mixed red and black soils predominate. There are also some laterites and lateritic soils, alluvial soils and saline and alkaline soils in the basin.

The principal soils in the several sub-basins are shown in the following table :—

Sub-basin	Soils
K1 Upper Krishna	Generally medium black. In the valleys, medium and deep black, lateritic in western parts.
K2 Middle Krishna	Principally medium and deep black.
K3 Ghataprabha	Medium and deep black; also lateritic.
K4 Malaprabha	Lateritic, deep to medium black, mixed red and black.
K5 Upper Bhima	Generally medium black. Deep black in the valleys along river courses.
K6 LowerBhima	Shallow and medium black, deep black along river courses, lateritic.
K7 Lower Krishna	Predominantly red sandy loam. Some red and black. Deep black in the valley along river course. Alluvial in Delta.
K8 Tungabhadra	Red Sandy to loamy in the upper reaches. Red, sandy red, and sandy black in the lower parts. Deep black in the valley along river courses.
K9 Vedavathi	Predominantly red loamy and red sandy. In the upper reaches of rivers, deep black. Mixed red and black soils.
K10 Musi	predominantly red sandy, red loamy soil.
K11 Palleru	Predominantly red loamy soil.
K12 Muneru	Red loamy.

The capability of the soil and the use to which it may be put are determined largely by the depth, texture, structure, permeability, moisture holding capacity, nutrient elements, organic matter, degree of acidity or alkalinity, surface drainage, slope, susceptibility to erosion and other characteristics of the soil.

Crop seasons.—The crop seasons in the Krishna basin are not as well defined as in northern India. The sowing of crops and other agricultural operations are determined largely by the timing and incidence of rainfall. In Maharashtra and Bombay-Karnataka areas of Mysore in the Krishna basin, broadly the crop seasons are June to October (Kharif). October to February (Rabi) and February to June (Hot weather). In Andhra Pradesh and the rest of Mysore, the crop season for irrigated paddy in June-July to November-December (Abi) and January to April (Tabi).

Crops.—The main crops of the Krishna basin are jowar, bajra, cotton, oilseeds, pulses, tobacco, wheat, gram, ragi, paddy and sugarcane. There are patches of vegetable and fruit cultivation including mangoes, sweet limes, grapes, bananas, chillies and lemons. Water melons are grown in the rever bed. Paddy and sugarcane are mostly irrigated crops. The other crops are grown under both rainfall and irrigated conditions.

In all the three States, jowar and bajra are the staple food crops and are extensively cultivated. Bajra is grown on the poorer soils. Pulses are sown mostly as winter crops. Cotton is grown in rich black soils. Groundnut and oilseeds are extensively grown.

In Maharashtra, the jowar-bajra-wheat-oilseeds-sugarcane zone of the Bhima valley and the jowar-bajra-wheat-sugarcane belt of the Krishna valley are important agricultural regions. Sugarcane has increasing acreage under cultivation. Paddy, cotton and tobacco are other important crops.

In Mysore, jowar is an important food crop. Wheat is grown mostly in Belgaum, Bijapur, Gulbarga, Bidar and Dharwar Districts. In irrigated areas, rice is a favourite crop. Bijapur, Dharwar, Bellary, Chitradurga, Raichur and Gulbarga Districts are important cotton areas. Sugarcane and tobacco are also grown. Spices and arecanut are important subsidiary crops.

In Andhra Pradesh, rice production finds pride of place throughout the State. Tobacco cultivation is a speciality in the dry tracts of Guntur, Prakasham and Krishna Districts. Sugarcane is also grown.

Land use of Krishna basin area in the three States during 1967-68.

Andhra Pradesh: Of the gross irrigated area of 8,70,000 hectares, about 82.4% is under paddy, 0.9% under sugarcane and the balance under other crops. The other irrigated crops are jowar, bajra, maize, wheat, ragi, millets, condiments, spices, groundnut, sesamum, cotton, tobacco and fodder crops. Food and non-food crops respectively cover about 92.1% and 7.9% of the irrigated cropped area.

Maharashtra : Of the gross irrigated area of 5,53,700 hectares nearly 32.8% is under jowar, 16.8% under sugarcane, 10.6% under wheat, 5.2% under bajra, 4.8% under paddy and the balance under other crops. The other irrigated crops are maize, ragi, cotton, barley, gram, pulses, condiments, spices, groundnut, sesamum, tobacco and fodder crops. Food and non-food crops cover about 90.5% and 9.5% of the irrigated cropped area respectively.

Mysore : Of the gross irrigated area of 6,80,500 hectares, 47.7% is under paddy, 12.9% under jowar, 7.6% under sugarcane, 3.3% under maize, 1.9% under wheat and the balance under other crops. The other irrigated crops are ragi, barley, millets, gram, pulses and cotton. The food and non-food crops represent about 84.0% and 16.0% of the irrigated cropped area respectively.

Of the total irrigated area in the basin, 50.7% is under paddy, 13.2% under jowar, 7.2% under sugarcane, 3.5% under wheat, 1.5% under bajra, 2.0% under maize and the balance under other miscellaneous crops.

Out of a total area of 26 million hectares, nearly 3 million hectares are under forests. The area annually cropped in the Krishna basin is about 16.4 million hectares. Agriculture is generally rain-fed relatively low yields except in about 2.1 million hectares of irrigated area, of which about 1.07 million hectares grow paddy.

Other data regarding Krishna basin: An agreed statement giving the catchment areas at different points in the Krishna basin as also agreed data regarding forests, minerals, industries and communications in the Krishna basin and a brief description of the population, topography etc. of the States of Maharashtra, Mysore and Andhra Pradesh are included in the volume containing appendices.

CHAPTER IV

Inter-State conference and disputed agreement of July, 1951 Issue I

Inter-State conference on the 27th and 28th July, 1951 :

A conference was held in the Planning Commission, New Delhi, with the representatives of Bombay, Madras, Hyderabad, Mysore and Madhya Pradesh Governments to discuss the utilisation of supplies in the Krishna and Godavari river basins so that an assessment could be made of the relative merits of the projects for inclusion in the First Five Year Plan. The Governments of Mysore, Bombay, Madras and Hyderabad only were interested in the supplies of the Krishna river basin.

Disputes : In the present proceedings, the dispute is whether as a result of the deliberations at the conference, a concluded agreement was reached between the States of Bombay, Madras, Mysore and Hyderabad regarding allocation of the waters of the Krishna basin and, if so, whether it is valid and subsisting.

Pleadings : Andhra Pradesh pleaded that a concluded agreement was reached amongst all the four States regarding the Krishna waters. Maharashtra and Mysore pleaded that there was no concluded agreement. They alleged that the agreement, if any, was invalid because (i) it did not conform to the provisions of article 299 of the Constitution and (ii) it was inequitable, arbitrary and based on inadequate data. They also alleged that (i) the agreement, if any, had become void because it allocated water for specific projects and some of the projects had been abandoned and (ii) it ceased to be operative on the reorganisation of States.

Issue : Accordingly the following issue was raised on the 29th January, 1970.—

Issue I: Was there any concluded agreement regarding allocation of the waters of the river Krishna as alleged ? Was the agreement valid and enforceable ? Is it still subsisting and operative and binding upon the States concerned in the present reference ? If so, with what effect ? Is there any breach of the agreement as alleged ?

Sub-issues

(1) Was there a concluded agreement as alleged ? Was the agreement ratified, acted upon and treated as binding by the States concerned ?

(2) Was the agreement in conformity with article 299 of the Constitution ? Was it within the purview of the article ?

(3) Was the agreement inequitable or arbitrary or based on inadequate data ? If so, with what effect ?

(4) Did the agreement on its true construction allocate waters for specific projects ? Have some of the projects been abandoned ? If so, has the agreement become void ?

(5) Has the agreement ceased to be operative on the reorganisation of the States ?

(6) If the agreement is binding, what re-allocation of waters, if any, should be made, in view of the reorganisation of States ?

(7) Is there any breach of the agreement as alleged by Andhra ?

(8) Is the validity of the agreement dependent upon the validity of the Godavari agreement ?

Supplementary Pleadings : On the 29th January, 1971, the Tribunal directed Andhra Pradesh to furnish particulars of the alleged agreement. Andhra Pradesh supplied the particulars, and all parties filed supplementary pleadings.

Divergent case of the parties on the question whether there was a concluded agreement :

The case of Andhra Pradesh is that (1) the agreement regarding the allocation of the Krishna water was

oral and was entered into on the 27th July, 1951 at the conference among Shri Jivraj Mehta, Minister, P.W.D., Bombay, Shri M. K. Vellodi, Chief Minister, Hyderabad, Shri M. Bhakatavatsalam, Ministry, P.W.D., Madras and Shri K. C. Reddy, Chief Minister, Mysore, on behalf of their respective States, (2) there was a separate oral agreement on the 28th July, 1951 among Bombay, Hyderabad and Madras modifying their respective shares of the Krishna waters and Mysore was, in no way, affected by this modification and (3) Mysore ratified, acted upon and treated the agreement as binding and is precluded from denying it.

Andhra Pradesh relied upon the alleged oral agreement of the 27th July, 1951. It is not the case of Andhra Pradesh that the agreement was made in writing or that there was an oral agreement on the 28th July to which Mysore was a party.

Mysore and Maharashtra denied that there was any oral agreement on the 27th July or that a separate and distinct oral agreement concerning the Krishna waters was reached on the 28th July.

It is common case that a memorandum of agreement was drawn up and was subsequently ratified by Bombay, Hyderabad and Madras. It is the case of Andhra Pradesh that the three States, having ratified the memorandum of agreement, were bound by it. On the other hand, it is the case of Mysore and Maharashtra that the three States ratified the memorandum of agreement upon the condition that Mysore also would ratify it, and that as Mysore refused to ratify, there was no operative and concluded agreement by which the ratifying States were bound.

Points for decision :

The points arising for decision are : (1) whether there was a concluded oral agreement on the 27th July, 1951 between the concerned States including Mysore regarding the Krishna waters, (2) whether Mysore ratified the agreement, (3) whether Mysore acted upon and treated the agreement as binding and is precluded from denying it and (4) whether, in the absence of ratification by Mysore, there was any operative and concluded agreement.

Evidence.—The praties did not call any oral evidence on Issue No. 1. They relied entirely on the documentary evidence on the record.

Preparations for the conference.—The Governments of Bombay, Hyderabad and Madras had important schemes for irrigation and electrification based on the Krishna river and its tributaries, such as the Koyna Project (Bombay), the Lower Krishna (Hyderabad) and the Krishna Pennar Project (Madras). On the 7th May, 1951, the Planning Commission wrote to the Governments of Bombay, Hyderabad, Madras and Mysore suggesting that a conference might be convened to discuss the schemes so that early decisions might be taken on what schemes might be included in the First Five Year Plan and requesting them to send particulars of the schemes under contemplation, the quantum of proposed withdrawals, the supplies available at the proposed sites of withdrawals, the quantum of withdrawals by works already under construction or in operation, the financial aspect of the projects and other details. All the State Governments supplied the required particulars. The information supplied by each Government was communicated to the other Governments. Eventually, the Planning Commission invited all the four States to attend a conference at New Delhi on the 27th and 28th July, 1951, and they all agreed to attend. Mysore was brought into the picture as it was interested in the supplies of the Krishna basin. The Government of Madhya Pradesh was invited as it was interested in the supplies of the Godavari basin and the conference was convened to discuss the schemes on the Godavari river system also.

Persons present at the conference :

The conference was duly held on the 27th and 28th July, 1951 at New Delhi. The Planning Commission was represented by Shri V. T. Krishnamachari, Member, G. R. Garg, Chief of Natural Resources Division and others. Shri N. V. Gadgil, Minister for Works, Production and Supply, attended by invitation. The Central Water and Power Commission was represented by its Chairman Shri A. N. Khosla and others. Bombay was represented by Dr. Jivraj Mehta, Minister, P.W.D., Shri Naik Nimabalkar, Development Minister, the Secretary, P.W.D. and two engineers. Madras was represented by Shri M. Bhakatavatsalam, Minister, P.W.D., the Secretary, P.W.D. and three enginees. Hyderabad was represented by Shri M. K. Vellodi, Chief Minister, Nawab Zain Yar Jung, Minister, P.W.D. and two engineers.

Mysore was represented by Shri K.C. Ready, Chief Minister. Shri Ready was not accompanied by any engineer or other officer. He attended the conference on the 27th July, 1951 only.

Andhra Pradesh's pleading (1) suggests that he was present in the forenoon on the 27th July, 1951 for a few hours only at the inaugural session of the conference. However, the summary record of discussion stated that he attended on the 27th July and we shall assume that he was present at the conference in the afternoon also on that day.

Shri Aghnibhoj, Minister, P.W.D., Madhya Pradesh, also attended, but he was interested in the Godavari basin only.

Summary record of discussions, memorandum of agreement and C.W.P.C. technical note :

The Central Water & Power Commission prepared a technical note on the utilisation of supplies in the Krishna valley on the basis of the information supplied by the State Governments. The Planning Commission kept a summary record of the discussions at the conference. A memorandum of agreement allocating the flows of the river basins amongst the concerned States was drawn up and annexed to the summary record of discussions. Copies of the three documents are given at the end of this Chapter.

Main provisions of memorandum of agreement :

The memorandum of agreement was divided into three parts. Part I related to the Krishna. The dependable annual flow of the Krishna basin was accepted as 1715 T.M.C. The allocations for the existing utilisations and for projects under construction were as follows :—

	T.M.C.
Bombay	176
Hyderabad	180
Mysore	98.5
Madras	290
	744.5

It was stated that if there were any omissions in respect of the existing utilisations, the necessary adjustments would be made in the figures of dependable flow and existing utilisations. The balance flow after meeting the above allocations was taken to be 1000 T.M.C. and was allotted as follows :—

	Per cent	T.M.C
Bombay	24	240
Hyderabad	28	280
Mysore	1 (provisional)	10
Madras	47	470

The balance flow in excess of 1000 T.M.C. was allotted as follows :—

Bombay	30 per cent
Hyderabad	30 per cent
Mysore	1 per cent (provisional)
Madras	39 per cent

It was stated that, as a result of further engineering scrutiny, the allocation to Mysore might be increased by 1%, such increase to come out of the share of Madras.

Part II related to the Godavari. Part III contained general provisions. It was provided that the allocations would be reviewed after 25 years.

The summary record of discussions shows that there was no concluded oral agreement on the 27th July:

The summary record of discussions shows that in the forenoon of the 27th July 1951, the conference assembled, Shri V. T. Krishnamachari opened the discussion, Shri G. R. Garg explained the technical note and several participants expressed their views on the available supply and its utilisation. Thereupon the conference adjourned till 4 P.M. to enable the engineers to arrive at an agreement about the Krishna waters. At 4 P.M. the conference re-assembled and the engineers reported a tentative agreement regarding the Krishna waters. No engineer of Mysore was present at the deliberations of the engineers or was a party to the tentative agreement reported by them.

After the conference re-assembled at 4 P.M., Shri N.V. Gadgil suggested that the percentage adopted by the engineers for Bombay should be increased. After discussion it was agreed that a different set of proportions for discharges above 1000 T.M.C. should be adopted in respect of the Krishna waters, but the proportions were not settled and agreed to on the 27th July.

The memorandum of agreement was not prepared on the 27th July and Shri K. C. Reddy could not have agreed to the terms of the memorandum on that day. Clearly, there was no concluded agreement on the 27th July.

(1) APK IV pp. 5-6.

On the 28th July at 10 A.M., the engineers met to discuss the distribution of waters in the Godavari basin and arrived at a tentative set of proportions concerning allocation of the Godavari waters. The conference assembled at 11.30 A.M. and considered the proposal of the engineers regarding the Godavari. The engineers were requested to prepare a memorandum of agreement and the conference adjourned till 3.30 P.M.

Thereafter the engineers drafted a memorandum of agreement. Parts I and II related to the Krishna and the Godavari respectively. The general provisions of Part III applied to both the rivers, and its wording suggests that its terms were discussed and tentatively agreed upon by the engineers after they had arrived at the tentative agreement regarding the Godavari on the 28th July.

After the draft memorandum of agreement was prepared, the conference re-assembled at 3.30 P.M. and proceeded to consider the draft sentence by sentence. In other words, the draft was subjected to close scrutiny and discussion. Clearly, up to this point of time, no final agreement had been concluded.

Shri N. V. Gadgil stated that the proportions for the Krishna waters worked out on the previous day were not equitable. After some discussion the proportions were modified, Bombay getting 4 per cent more and Hyderabad and Madras each getting 2 per cent less.

A final draft of the memorandum of agreement was then drawn up. The summary record of discussions stated that the basis of distribution of the Krishna and Godavari waters was shown in the annexed memorandum of agreement as finally agreed to by the conference.

There is no record of an oral agreement regarding the Krishna waters on the 27th July and a distinct and separate oral agreement on the 28th July modifying an earlier agreement. There were only discussions and negotiations on the 27th July.

Admittedly on the 28th July, Mysore was not represented at the conference and could not have agreed to the memorandum of agreement prepared on that day.

The memorandum of agreement was not the record of a concluded agreement :

Though the summary record of discussions stated that the memorandum of agreement annexed to it was finally agreed to by the conference, the Mysore Government, at the earliest opportunity on the 24th September, 1951, treated the memorandum as a draft agreement (2). The statement was fully justified, as the Mysore Government was not represented at the conference on the 28th July when the draft was prepared. All the States were asked to ratify the agreement presumably because the memorandum of agreement was a draft and not the record of a concluded agreement.

Absence of a signed agreement and necessity of ratification by the concerned States :

The avowed object of the conference was to discuss the utilisation of the supplies of the Krishna river system, so that an assessment might be made of the projects for inclusion in the First Five Year Plan. However, at the conference, a memorandum of agreement was drawn up allocating the supplies among the concerned States for a period of 25 years. But it is the common case that the representatives of the State Governments did not sign and execute any agreement at the conference. Immediately after the conference, the Planning Commission requested all the State Governments to ratify the agreement. The Government of Bombay, Madras and Hyderabad sent their letters of ratification to the Planning Commission. As ratification was considered essential, repeated requests for ratification were made to the Mysore Government. No one suggested that ratification was unnecessary.

From the surrounding circumstances we draw the inference that the representatives of the State Governments did not intend to bind their Governments by an oral agreement. On the contrary, they intended that the State Governments would be bound only if they sent formal signed letters of ratification addressed to the Planning Commission within a reasonable time.

Mysore's demands for water were not properly scrutinised at the confernece :

Mysore had set forth its demands for water in its letter to the Planning Commission dated the 23rd

(2) MYDK I, p. 20.

June, 1951(3). These demands were summarized in the C.W. & P. C. technical note. At the conference on the 27th July, Shri K. C. Reddy handed over to the Chairman, C. W. & P. C. another note setting forth Mysore's revised demands. Shri Reddy's note was kept in the records of the Planning Commission.(4) But apparently only the C. W. & P. C. note was discussed at the conference. The demands as allowed by the conference were shown in the memorandum of agreement.

The following table shows Mysore's demands (1) as summarised in the C. W. & P. C. technical note, (2) as made in Shri Reddy's note and (3) as allowed by the memorandum of agreement:—

	Existing utilisation T.M.C.	Projects under construction T.M.C.	New Projects T.M.C.	Evaporation loss T.M.C.	Total T.M.C.
1	2	3	4	5	6
C.W. & P.C. technical note . . .	30	68.50	25.50	--	124
Shri Reddy's note	45.07	70.25	23.75	4.50	143.57
Memorandum of agreement . . .	30	68.50	10 (provisional and subject to increase up to 30 T.M.C. on further scrutiny)		118.50

The evaporation loss was not quantified in Shri Reddy's note but it was later shown as 4.50 T.M.C.

The Mysore Budget estimates of 1951-52(5) show the Mysore projects then under construction. It is not disputed that these projects involved the use of 70.25 T.M.C. of water annually.

In the absence of Mysore's engineers, its demands of water could not be properly scrutinized at the conference.

The discrepancy between Mysore's earlier demand for 30 T. M. C. and its revised demand for 45.07 T.M.C. for existing utilisation was not checked and the correct figure for existing utilisation was not ascertained. Presumably for this reason, the draft memorandum of agreement stated that the allocations for existing utilisations might require modification.

The memorandum of agreement erroneously assumed that Mysore's projects under construction would require 68.50 T.M.C. only, though, as a matter of fact, they involved the use of 70.25 T.M.C.

Mysore's claim for allotment of 23.75 T.M.C. of water for its new projects could not be properly considered in the absence of its engineers. For this reason, the memorandum of agreement provided that the allotment for the new projects of Mysore was provisional and might have to be increased on further engineering scrutiny.

Mysore refused to ratify the agreement unless its demands for 143.5 T.M.C. of water was allowed in full

Contention that Mysore wanted to preserve only the right under an earlier Tungabhadra agreement is rejected :

Andhra Pradesh argued that Mysore wanted to preserve only its established rights under an earlier Tungabhadra agreement and that as these rights were preserved by the memorandum of agreement of 1951, Mysore suffered no prejudice. It was argued that the statement of Shri K. C. Reddy at the conference supported the contention. Shri Reddy had stated that "So far as the Krishna River basin was concerned, Mysore had certain agreement with Madras and

(3) MYDK I p. 9; APDK I pp. 27—29.
(4) APDK IX pp. 76—80.
(5) MYDK XVII, pp. 31—32.

Hyderabad and the new agreement, that might be arrived at, should take a note of the existing agreement". Obviously Shri Reddy was referring to the agreement of July, 1944 between Madras and Mysore as modified by the supplemental agreements of December, 1945 and 1946 among Madras, Hyderabad and Mysore.

Shri Reddy wanted to preserve Mysore's established rights under the earlier Tungabhadra agreement, but he did not say that Mysore had no other claims on Tungabhadra waters. As a matter of fact, Mysore's notes had put forward larger claims.

The agreement of July 1944 between Madras and Mysore related to the Tungabhadra waters above Mallapuram only. It did not settle Mysore's share in the waters of the Vedavathi sub-basin.

The agreement of July 1944 fixed the shares of Madras and Mysore only in the Tungabhadra waters above Mallapuram. It did not bind the other riparian States. It contemplated that in a final apportionment of the Tungabhadra waters at the instance of the other States, a different share might be allotted to Mysore.

The agreement of July, 1944 preserved Mysore's existing utilisations above Mallapuram and established Mysore's right to use other quantities of water. It is not shown to our satisfaction that these rights were fully or unconditionally preserved by the memorandum of agreement of 1951.

Ratification of memorandum of agreement by Bombay, Madras and Hyderabad :

On the 31st July, 1951, the Planning Commission wrote to the Governments of Bombay, Madras and Hyderabad enclosing copies of the summary record of discussions and memorandum of agreement and asking them to ratify the agreement. Letters of ratifications were sent to the Planning Commission by the Madras Government on the 17th August, 1951, by the Hyderabad Government on the 23rd August, 1951 and by the Bombay Government on the 30th August, 1951.

Mysore's refusal to ratify.—On the 31st July, 1951, the Planning Commission wrote to the Mysore Government enclosing the documents and asking for early ratification of the agreement. Shri V. T. Krishnamachari wrote a similar letter to Shri K. C. Reddy. On the 3rd August, 1951 the Mysore Government acknowledged receipt of the documents. On the 17th September, 1951, the Personal Assistant to Shri Reddy wrote to the Personal Secretary to Shri Krishnamachari stating that Shri Reddy was unwell and unable to attend to the matter and that the ratification of the agreement would be sent by the concerned Secretary to the Government soon.

On the 24th September, 1951, the Mysore Government wrote to the Planning Commission stating that the draft agreement should be modified so as to allow Mysore the right to use 143.5 T.M.C. of water as asked for in Shri Reddy's note and that the question of ratification would be considered after the necessary modifications were made. The letter was sent with the approval of Shri Reddy. Had Shri Reddy been a party to a concluded agreement, he could not have treated the memorandum as a draft agreement. On the 4th October, 1951, the Planning Commission wrote to the Mysore Government stating that the discrepancy between 45 T.M.C. claimed in Shri Reddy's note and 30 T.M.C. allowed by the memorandum of agreement on account of existing utilisation could be corrected under paragraph 2 of Part I of the memorandum, but the correction could be done only after careful verification and consultation with the other State Governments and, as this would take a considerable time, Mysore should not withhold ratification of the agreement. Significantly, the letter did not say that Mysore was resiling from a concluded agreement. Nor did the letter explain whether the discrepancy between 70.25 T.M.C. claimed in Shri Reddy's note and 68.50 T.M.C. allowed by the memorandum for projects under construction could be corrected. Clearly, this discrepancy could not be corrected under paragraph 2 of part I of the memorandum. On the 3rd and 19th, November, 1951, the Planning Commission sent reminders. On the 10th December, 1951, Mysore reiterated its previous stand.

On the 30th March, 1952, Shri K. C. Reddy ceased to be the Chief Minister of Mysore and, in his place, Shri Hanumanthiah became the Chief Minister. On the 3rd May, 1952, Shri V. T. Krishnamachari wrote to Shri Hanumanthiah stating that, as Mysore had some doubt about the effect of the memorandum of agreement on Mysore's rights under the earlier Tungabhadra agreement, Mysore might ratify the agreement with the proviso that the ratification would not affect Mysore's rights under the earlier agreement. In his letters dated 31st October, 1952 and the 16th December, 1952 to Shri Hanumanthiah, Shri Krishnamachari repeated the suggestion. But the clause that Mysore would continue to retain its rights under the earlier agreement could not be inserted in the memorandum of agreement without the consent of the other State Governments. A conditional ratification with a proviso preserving those rights would be tantamount to a refusal to ratify and would amount to a new offer. Had the memorandum of agreement been finally agreed

to at the conference, Mysore could not be asked to ratify it after adding a new term. On the 4th January, 1953, Shri Hanumanthiah wrote to Shri Krishnamachari stating that, in view of the recent drought in the areas served by the Tungabhadra waters, the tentative discussions of the July 1951 conference could not be regarded as a proper basis for the finalising of an agreement and that another conference should be called for the purpose. The letter also stated that no engineer from Mysore was present at the conference nor was any Mysore representative present at the deliberations on the 28th July, 1951 though their presence was necessary for fixing the allocation to Mysore. In his reply dated the 4th March, 1953, Shri Krishnamachari stated that Shri K. C. Reddy was present at the conference on the 27th July, 1951 when an agreement was reached on the use of the Krishna waters, that the changes made on the second day did not affect Mysore's share and that Mysore should ratify the memorandum of agreement, as its interests were protected by the memorandum and by the express reservation of its rights under the earlier Tungabhadra agreement to which the Planning Commission had agreed. It was not explained how the Planning Commission could agree to a new term without any authority from the other States.

On the 14th September, 1953, the Andhra State Act, 1953 was passed. Under this Act the Kannada speaking Taluks of Bellary District were added to the State of Mysore as from the 1st October, 1953. On the 19th September, 1953, Shri Hanumanthiah wrote to Shri Krishnamachari claiming more water for Mysore areas including water for the Bellary areas. On the 16th December, 1953, Shri Krishnamachari wrote to Shri Hanumanthiah stating that equitable adjustments on account of the transfer of Bellary areas to Mysore could be made later. On the 15th July, 1954, Shri Hanumanthiah wrote to Shri Krishnamachari stating that corrections on account of irrigation of the Bellary areas were absolutely necessary. In the subsequent correspondence up to the 18th March, 1955, these views were reiterated.

Effect of the correspondence between the Mysore Government and the Planning Commission :

The correspondence mentioned above(6) taken either singly or collectively did not amount to ratification of the agreement by the Mysore Government. Nor does it show that there was a concluded oral agreement in July, 1951.

Erroneous statements that there was an agreement in 1951 and Mysore had ratified it:

There were numerous official statements that an agreement on the allocation of the Krishna waters was reached at the inter-State conference held on the 27th and 28th July, 1951. The Bombay Government made such statements in various official letters and documents.(7) Similar statements were made by central authorities.(8) All these statements erroneously assumed that the Mysore Government was a party to the agreement and had ratified it. The Lower Krishna Project Report 1952 prepared by the Hyderabad State explicitly stated that the agreement had been ratified by Mysore. On a review of the correspondence, we have already shown that Mysore refused to ratify the agreement. Some authorities were not even aware of the refusal of Mysore to ratify. The Central Water and Power Commission in its letter to the State Governments dated the 24th February, 1959(9) stated that it was not known whether Mysore had ratified the agreement.

Moreover, the Andhra Pradesh Government in its letter to the Central Water and Power Commission dated the 10th July, 1959, (10) and at the inter-State conference on the 26th and 27th September, 1960,(11) all the States admitted that the agreement was not ratified by Mysore. Finally, on the 23rd March, 1963, the Union Minister for Irrigation and Power stated in the Lok Sabha(12) "They (the Planning Commission) convened a conference in New Delhi on 27th and 28th July, 1951, to discuss the utilisation of supplies in the two river basins and make an assessment of the relative merits of the projects proposed for inclusion in the second part of the First Year Plan.***(*).

(6) MYDK I pp. 11—54; APDK IX pp. 69, 72.

(7) Letter dated 27-12-1951 to the Madras Government; APK II p. 34; Letter dated 30-7-1959 to the Government of India, MRK-II pp. 181—189; Letter dated 30-8-1959 to the Planning Commission, APK-II pp. 83-88; Koyna Hydro Electric Project Reports of January 1952 p. VI, December 1952 p. V, March 1956 p. IV, October 1956 p. IV.

(8) Statement of Prime Minister Shri Jawahar Lal Nehru in the Lok Sabha on 31-8-1951, APDK -IX p. 43; First Five Year Plan p. 355; Report of the Technical Committee for the Optimum Utilisation of Krishna and Godavari Waters, December 1952, pp. 15, 16, 91—93; Report of the States Reorganisation Commission 1955, p. 24.

(9) MYDK I, pp. 59 -61.

(10) APDK I, pp. 72-73.

(11) APDK IV, pp. 2—17.

(12) APK II, pp. 123—125.

After a brief review of the then existing utilisation of supplies in the two river basins and the contemplated utilisation by the States concerned, a memorandum of agreement was drawn up, allocating the flows of the two rivers amongst the participating States. While the other participating States ratified the agreement, Mysore objected to it at the earliest opportunity and declined to ratify it.*** In order to bring about a settlement, an inter-State conference was convened in New Delhi under my chairmanship on September 26 and 27, 1960. Owing, however, to widely divergent views expressed at the conference, no settlement could be reached.**** As grave doubts were expressed at the conference about the validity or otherwise of the 1951 Agreement, my Ministry had the whole matter examined by the Ministry of Law at the highest level. Briefly the advice of the Ministry of Law was that the Agreement was legally wholly ineffective and unenforceable. This view was generally supported by the Attorney General of India, who stated that the Agreement must be treated as having become void, if it was not void at least partially *ab initio*".

Statements that Planning Commission had made an award in July, 1951 :

As no binding agreement concerning the Krishna waters was reached at the conference held on the 27th and 28th July, 1951, it was thought that the memorandum of agreement drawn up in July 1951 was an award made by the Planning Commission and/or the Government of India with regard to the allocation of the Krishna waters for the existing and future projects of the States and statements to that effect were made from time to time.(13)

Statements by the Mysore Government and others that there was an award:

The Government of Mysore and other authorities stated that the Planning Commission had made an award in 1951. Clause 10(i) of the conclusion reached at the conference of Ministers of Andhra Pradesh and Mysore held at the Tungabhadra Dam on the 5th and 6th October 1957,(14) stated: "It is agreed that the waters of the Reservoir be utilised on both sides in the manner and for the areas specified by the Governments of former Hyderabad and Composite Madras States in conformity with the framework of the Planning Commission award of 1951 irrespective of the territories in which the areas are now situated The question of utilisation of surplus waters, if any, will be considered after a period of two years."

On an enquiry made by the Andhra Pradesh Government on the 14th August, 1957(15) whether the proposed abstraction of supplies by the Gayathri reservoir, then under construction, would be within the allocations of the Delhi award of 1951, the Government of Mysore stated on the 8th August, 1958(16) that the contemplated storage through the reservoir would be well within the provisions of the award. On a further enquiry by the Andhra Pradesh Government, the Mysore Government said that the so-called '1951 award' was legally void and unenforceable. (17)

During the negotiations with the Bombay Government with regard to the sharing of the water stored in the Koyna reservoir, the Government of Mysore in its letter dated the 20th October 1958(18) sought to justify its demand for the water on the basis of 'the Planning Commission award of 1951'. The negotiations were inconclusive and no agreement was reached on the subject between the two Governments.

In the correspondence regarding the clearance of Ghataprabha Project, Stage II during 1959(19) the Central Water & Power Commission as also the Mysore Government referred to the 1951 award of the Planning Commission.

During 1959-1960, in course of the correspondence arising out of the proposal of the Central Water and Power Commission for reallocation of the Krishna waters in consequence of the reorganisation of States, reference was made to the allocations in the Planning Commission award of 1951 by the Government of India, (20) the Andhra Pradesh Government (21) and the Mysore Government.(22) Subsequently in 1961(23) the Mysore Government stated that the so called memorandum of agreement of 1951 could not be regarded as an award and that the Planning Commission had no authority to make any award.

(13) See letter of the Madras Government to the Bombay Government dated 11-5-1953, APDK-IX pp. 25—27 (Award of July, 1951 made by the Government of India); Report on the Tungabhadra Project High Level Canal Scheme 1954, Government of Andhra APPK III, p. 7 (allocation of the Planning Commission); Report of the COPP Irrigation and Power Team on Nagarjunasagar Project 1960, pp. 4-5 (1951 award and allocations as fixed by the Planning Commission at the 1951 Conference).
(14) APK II, pp. 58—59
(15) APDK IX, p. 171.
(16) APDK IX, pp. 172—174.
(17) MYDK XVII, pp. 23—29.
(18) MRDK VI, pp. 56—60.
(19) MYDK XII, pp. 80—115.
(20) MYDK I, p. 87
(21) APDK I, pp. 72—81.
(22) APK IV, pp. 95—101; MYDK-I, pp. 91—92.
(23) MYDK I, pp. 95—102.

The Planning Commission did not make and had no power to make an award:

In the present proceedings, none of the parties relied on any award made by the Planning Commission or the Government of India concerning the Krishna waters and consequently no issue was raised as to the existence and validity of the supposed award. It is plain beyond doubt that in July 1951 the Government of India or the Planning Commission had no power of superintendence or paramountcy control over the States and had no authority to make an award apportioning the Krishna waters, nor had they, as a matter of fact, made such an award. The minutes of the Tribunal's proceedings, dated the 17th February, 1971 recorded the following admission of the parties:—

> "Learned Advocate General of Andhra Pradesh, Learned Advocate General of Maharashtra and Mr. T. Krishna Rao on behalf of their respective States stated before us that the **Planning Commission did not make any** nor had the Planning Commission any **award in respect of Krishna Waters in 1951** authority to make the award. Be it recorded that this was conceded on behalf of the aforesaid States at the time when the Issues were framed and accordingly no Issue was raised on the question whether the Planning Commission made an award in 1951 regarding Krishna waters and whether the Planning Commission had any authority to make the award."

Mysore is not estopped from denying the existence and validity of the agreement:

Andhra Pradesh contended that the statements of Mysore in the above mentioned documents show that the Mysore Government acted upon and treated the agreement of 1951 as binding and was, therefore, estopped from denying it. We are unable to accept this contention. It is to be observed that none of the documents contained any representation by the Mysore Government that there was a concluded and binding agreement in 1951 concerning the allocation of the Krishna waters, nor did any party act upon such a representation. Instead of stating that there was such an agreement, all the documents referred to an award made by the Planning Commission in July 1951. It was because there was no concluded agreement in 1951, that the idea had gained ground that the Planning Commission had made an award in 1951 concerning the Krishna waters. Moreover, all these documents were written after 1956. In the meantime, extensive territoral changes in the Krishna basin had been made by the Andhra State Act, 1953 as from the 1st October, 1953 and by the States Reorganisation Act, 1956 as from the 1st November, 1956 and Mysore had acquired large territories in the Krishna basin. In this changed situation, Mysore could not have intended to affirm the memorandum of agreement prepared on the basis of conditions prevailing in July 1951.

Andhra Pradesh relied on the following passage in the judgment of Viscount Maugham in *Lady Naas v. Westminister Bank Ltd.*, 1940 A.C. 366, at 373:—

"It is clear beyond doubt that a party who knowingly takes the benefit of a deed is bound by it although he has not executed it." But Andhra Pradesh does not show that Mysore took any benefit under the agreement of 1951. At the earliest opportunity, Mysore repudiated the agreement and refused to abide by it. Dehors the agreement, Mysore was entitled to utilise the waters of the Krishna river system, and it continued to utilise them. The argument that Mysore is bound by the agreement of 1951 although it had not ratified the agreement must fail.

Conclusion that Mysore is not bound by the alleged agreement of July 1951 :

We are satisfied on the evidence that there was no concluded oral agreement on the 27th July, 1951 regarding the allocation of the Krishna waters as alleged. Mysore was not a party to any agreement reached at the conference, nor did Mysore subsequently ratify the agreement. Mysore did not act upon and treat the agreement as binding and is not precluded or estopped from denying the agreement. Mysore is not in any way bound by the alleged agreement.

The other State Governments ratified the agreement, but the question is whether they are bound by the agreement in the absence of any ratification by the Mysore Government. It is not the case of Andhra Pradesh that the other State Governments entered into any agreement other than the agreement set forth in the memorandum of agreement.

Memorandum of agreement could not take effect according to its tenor unless Mysore ratified it:

The memorandum of agreement apportioned the dependable flow of the Krishna river system and allocated specific quantities of water to four States. The allocation implied that each State would utilise the quantity of water allotted to it and no more. The memorandum as drafted could not take effect according to its terms unless Mysore accepted the allotment and bound itself to utilise the quantity of water allocated to it and no more. The rights and obligations of the other States were inextricably mixed up with those of Mysore and could not be separately enforced.

The other States ratified the agreement on the understanding that Mysore also would ratify it :

All the four States were invited to the conference and participated in its deliberations. A memorandum of agreement was drawn up and all the four States were requested to ratify it. The States of Bombay, Hyderabad and Madras ratified the agreement. As ratification by Mysore was necessary, repeated requests for ratification were sent by the Planning Commission to Mysore.(24) Mysore was a necessary party to the agreement as drafted. The other States could not have intended to affirm or ratify an agreement to which Mysore was not a party. The inference is irresistible that they ratified the agreement on the understanding that Mysore also would ratify it. The consideration for which they ratified the agreement and promised to abide by it was that all the States including Mysore also would ratify the agreement and be bound by it.

Law.—The law on the subject is well settled. In *Jainarian Ram Lundia* v. *Surajmall Sugarmul* 1949 F.C.R. 379, at p. 392, B. K. Mukherjee J., observed: "When parties enter into an agreement on the clear understanding that some other persons should be a party to it, obviously no perfected contract is possible so long as this other person does not join the agreement. This would be the position in law apart from any rule of equity." After referring to *Lady Naas* v. *Westminister Bank Limited* 1940 *A. C.* 366, in which case the House of Lords discussed the broad principles upon which equity would relieve a party from his obligations under an unconditional deed which took effect at law, he observed "and in order that a relief might be claimed in equity, it is necessary to prove that substantial injustice would result if the deed is enforced unconditionally against the executing parties. Relief, therefore, could be given in those cases where the strict enforcement of law would lead to the executing parties being saddled with heavier liability than they otherwise would incur or would make the transaction substantially different from what it would have been if all the parties had joined it".

CONCLUSION.—As already stated, the States of Bombay, Hyderabad and Madras ratified the agreement on the clear understanding that the State of Mysore would also join the agreement and would ratify it. As Mysore did not ratify the agreement, there was no operative and concluded agreement and the ratification by the three States were wholly ineffective. This is the position in law apart from any rule of equity. The ratifying States or their successor States are not bound at law by any agreement and they need not seek any equitable relief.

Answer to Issue I.—In view of the above conclusions, no other question under Issue I need be decided. We hold that there was no concluded and binding agreement regarding the allocation of the waters of the river Krishna as alleged. Issue I is answered accordingly.

24 See office notes in Planning Commission file APDD IX, pp. 45, 46, 48, 50, 52.

NOTES BY THE CENTRAL WATER AND POWER COMMISSION ON THE UTILISATION OF SUPPLIES IN THE KRISHNA VALLEY

Average annual runoff and dependable yield.

Discharge observations of the river Krishna are available for Bezwada site in Madras for the year 1895 to 1945 i.e., for 51 years. Actual yearly run-off are given in statement 'A'. The mean annual runoff comes to 1957 T. M. Cft. This, however, is available in 21 years only out of 54 and hence cannot be taken as dependable supply. Runoff of 1800, 1700 and 1450 are available in 30 years, 37 years and 44 years respectively. Hence dependable supplies at Bezwada excluding present utilisation above may be taken as 1450 T. M. Cft. This tallies with the figure worked out by Hyderabad. The Madras figure of 2000 is too high.

The existing utilisation of supplies above Bezwada is 120 in Bombay, 90 in Hyderabad, 30 in Mysore and 10 in Madras taking a total of 250. Hence total dependable supply in the river basin may be taken as 1700 T. M. Cft.

Existing Utilisation	T.M. Cft.
Bombay	
All minor works	120
Hyderabad	
Minor Works	90
Mysore	
Vanivilas Sagar	30
Madras	
K.C. Canal	10
Bezwada Anicut	200
TOTAL (A)	450

Projects under construction

Bombay	
Ghataprabha Left Bank Canal	15
Mulehir Weir	8
Radha Nagri	11.3
Other minor works	21.7
TOTAL	56.0
Hyderabad	
Tungabhadra	65
Rajolibunda	17
Minor Works	8
TOTAL	90
Mysore	
Bhadra reservoir	57
Tunga Anicut	11.5
TOTAL	68.5
Madras	
Tungabhadra	65.0
GRAND TOTAL	279.5
or say (B)	280

Water available for future Projects

Total of A and B above=450+280=730 T.M.cft. This leaves 1700—730=970 T.M.Cft. only for future schemes.

Projects under investigation or contemplation

Bombay	T.M.Cft.
Koyna Irrigation and Hydro-Electric (I Stage)	127
Koyna Irrigation and Hydro-Electric (II Stage)	46
Ghataprabha Valley	70
New Khadakvasla dam	33
Kukadi Irrigation project	28
Asoga Reservoir	25
Vir dam	14
Bhima storage	12
Other projects	25
TOTAL	380
Hyderabad	
Upper Krishna	165
Bhimana	80
Lower Krishna	240
Medium and minor projects	65
Extension of irrigation on Tungabhadra	35
TOTAL	585

	T.M.Cft.
Mysore	
Bhadra anicut	5
Vedavathi	1
Other works	19.5
TOTAL	25.5
Madras	
Krishna Pennar Project	825
Pulichintala Project	100
Tungabhadra High Level Canal.	25
TOTAL	950
GRAND TOTAL	1940

Hence the total demand on the waters of the Krishna considering projects proposed or under contemplation is 1940. 5 T.M.Cft., as against 970 T.M.Cft., the water potential remaining after catering to the demands by works already under operation and construction. The future demand is thus twice the availability of water in the basin.

A statement 'B' showing quantum of proposed utilisation, power installed and proposed irrigation with capital costs etc. is attached.

STATEMENT 'A'

Statement showing annual run off of Krishna at Bezwada anicut excluding existing utilisation.

Year	T.M. Cft.	M. Acre ft
1894-95	1809	41.60
1895-96	2085	47.95
1896-97	2320	53.36
1897-98	2481	57.06
1898-99	2271	52.22
1899-1900	854	19.64
1900-01	2577	59.24
1901-02	1822	49.90
1902-03	1732	39.83
1903-04	2952	67.89
1904-05	1456	33.53
1905-06	1131	26.01
1906-07	1643	37.78
1907-08	1911	43.95
1908-09	2293	52.73
1909-10	1746	40.05
1910-11	2171	49.93
1911-12	1135	26.10
1912-13	1907	43.86
1913-14	1445	33.23
1914-15	2750	63.25
1915-16	2250	51.75
1916-17	3487	80.20
1917-18	2569	60.08
1918-19	808	19.84
1919-20	1857	42.71
1920-21	1372	31.55
1921-22	1784	41.03
1922-23	1730	39.79
1923-24	2043	46.98
1924-25	1936	44.52
1925-26	1819	41.83
1926-27	1953	44.91
1927-28	2054	47.24
1928-29	1901	43.73
1929-30	1627	37.42
1930-31	1927	44.22
1931-32	2508	57.68
1932-33	2472	56.85
1933-34	2524	58.05
1934-35	1794	41.26
1935-36	1600	36.80
1936-37	1652	37.92
1937-38	3336	76.58
1938-39	2169	49.76
1939-40	1713	39.32
1940-41	1903	43.69
1941-42	1310	30.13
1942-43	1610	37.03
1943-44	1700	39.10
1944-45	2000	46.00

51 years average 1957 Average 45.01

Statement 'B'

Krishna Basin Projects

Statement showing quantum of proposed utilisation, power installed, proposed irrigation and cost.

Name of Project	Total demand T.M. Cft.	Proposed irrigation (acres)	Proposed power to be installed	Cost in lakhs of rupees	Return (%)
1	2	3	4	5	6
Bombay					
Koyna H.E. and Irrigation Project		4,40,000	6,00,000	9278	..
Other Project	173				
Ghataprabha Valley	70	6,00,000	..	2455	1.5
New Khadakvasla Dam	33	1,40,000	..	750	4.5
Kukadi Irrigation Project	28	1,30,000	..	600	4.2
Asoga Reservoir	25	74,200	..	472	5.0
Other Projects	42	2,34,350	..	1322	..
Other I Class works	9	..	..	..	..
	207	11,78,550	6,00,000	5599	

1	2	3	4	5	6
		Hyderabad			
Upper Krishna	165	7,34,000	80,000	3,800	6.08
Bhima	80	2,74,000	..	1,200	4.50
Lower Krishna	240	9,00,000	80,000	4,800	5.90
Medium and minor project	65	2,50,000	..	..	..
	550	21,58,000	1,60,000	9,800	..
		Mysore			
Bhadra Anicut	5	..	..	..	..
Vedavathi	1	Figures not given		..	..
Other works	19.5				
	25.5				
		Madras			
Krishna-Pennar Project	825	30,00,000 (I crop) 12,00,000 (II crop)	2,50,000	15,750	4.5
		Other Projects			
Pulichintala	100	6,00,000			
Tungabhadra High Level Canal	25				
	125				

Summary record of discussions at the Inter-State Conference on the utilisation of Krishna and Godavari Waters held in the Committee Room of the Planning Commission, New Delhi, on 27th and 28th July, 1951.

Planning Commission

Shri V. T. Krishnamachari, Member-Chairman.

Shri G. R. Garg, Chief of Natural Resources Division.

Shri K. S. S. Murthy, Asstt. Executive Engineer, Natural Resources Division.

Hon'ble Shri N. V. Gadgil, Minister for works, Production and Supply attended by invitation.

BOMBAY

Hon'ble Dr. Jivraj Mehta, Minister, P.W.D.

Hon'ble Shri Naik Nimbalkar, Development Minister.

Shri G. V. Bedekar, I.C.S., Secretary, P.W.D.

Shri Mirchandani, Chief Engineer, Electricity.

Shri Champhekar, I.S.E., Chief Engineer, Irrigation.

MADRAS

Hon'ble Shri M. Bhakthavatsalam, Minister, P.W.D.

Shri T. M. S. Mani, I.C.S., Secretary, P.W.D.

Shri A. R. Venkatacharya, I.S.E., Chief Engineer, Irrigation.

Shri N. Padmanahba Iyer, I.S.E., Superintending Engineer.

Shri M. D. Narasimhachari, Deputy Chief Engineer.

HYDERABAD

Hon'ble Shri M. K. Vellodi, Chief Minister.

Hon'ble Nawab Zain Yar Jung, Minister, P.W.D.

Shri Papaiah, Chief Engineer.

Mr. Jaffar Ali, Superintending Engineer.

MADHYA PRADESH

Hon'ble Shri R. Agnibhoj, Minister, P.W.D.

MYSORE

Hon'ble K. C. Reddy, Chief Minister (attended on 27th only).

CENTRAL WATER AND POWER COMMISSION

Shri A. N. Khosla, Chairman.

Shri Gadkary, Member.

Shri Dr. K. L. Rao, Director.

Shri C. S. Parthasarthy, Asstt. Engineer.

Opening the discussion Shri V. T. Krishnamachari stated the broad principles on which schemes for irrigation and power development should be selected for inclusion in the Plan. He mentioned that only projects, which had been thoroughly investigated and found technically, economically and financially justifiable, should be included in our Five Year Plan.

The object of the conference was to discuss the utilisation of supplies in the Krishna and Godavari river basins so that an assessment could be made of the relative merits of projects proposed for inclusion in the second part of the Five Year Plan. He referred to the technical paper already circulated showing the supplies available in these rivers. In considering the issues placed before the meeting, two points of view should be reconciled. The first was the need from an all India point of view for increasing available food supplies within the shortest possible time and on the most economic basis. The Irrigation Commission reporting over 50 years ago emphasised the need regarding irrigation development as a national-all-India-question. This was even more important now than it was in the past. India's food problem can be solved only on such a basis. The shortage of power in the Bombay City and surrounding areas should also be regarded as an urgent problem. On the other hand, regional development was important, especially the development of backward regions, and could not be ignored. He was confident that an agreement could be reached reconciling these two considerations in a practical manner which would be equitable to all areas concerned.

2. Shri G. R. Garg, Chief of Natural Resources Division, then gave a brief review of the existing utilisation of supplies in these river basins and the contemplated utilisation based on the technical note circulated by the Planning Commission.

Shri Venkatacharya, Chief Engineer, Madras, stated that the discharge figures of Krishna River, which had been worked out in the note, were under-estimated by about 8%. Shri Champhekar, Chief Engineer, Bombay, stated that the regeneration supplies in the river basin had not been taken into account. He thought that nearly 25 per cent to 40 per cent of the waters would perhaps be available as regeneration supplies. These points were noted.

3. Hon'ble Shri N. V. Gadgil drew attention to the extremely backward condition of certain districts of Bombay State, Poona, Sholapur, Bijapur, etc. He specially stressed the needs of the Karnatic areas. The development of these regions depended on the availability of power and irrigation and should have high priority. Their needs should be provided for.

Shri M. K. Vellodi, Chief Minister of Hyderabad, desired that certain broad principles of priority should be laid down by the conference, so that details could be worked out later on.

4. Shri V. T. Krishnamachari mentioned that apart from power supply projects in the Plan to meet existing deficits, irrigation had been given priority over power projects. The Planning Commission in their draft Five Year Plan has suggested a Committee for selecting projects for inclusion in the second part of the Plan, and set out the principles which should regulate the inclusion of projects in the Plan. No doubt certain States had some initial advantages—trained staffs and long experience of irrigation works—but the interests of other regions could not be neglected.

Hon'ble Shri K. C. Reddy, Chief Minister of Mysore, stated that so far as the Krishna River basin was concerned, Mysore had certain agreement with Madras and Hyderabad and the new agreement, that might be arrived at, should take note of the existing agreement.

5. Shri Rameswar Agnibhoj referred to the Wainganga Project of Madhya Pradesh. It was suggested to him that his Government should request the Central Water and Power Commission to complete the investigations so that negotiations might be undertaken with the adjoining States for utilising the power proposed to be generated.

6. Shri T. M. S. Mani of Madras suggested that the waters of the river basins should be distributed to the various States on a percentage basis so that every one would be affected equally in good or bad year.

7. Thereupon the Conference adjourned to enable the engineers to arrive at an agreement about the water of Krishna.

8. The Conference reassembled at 4 P.M. The engineers reported a tentative agreement regarding the

waters of the Krishna. Hon'ble Shri N. V. Gadgil suggested that the percentage adopted by the engineers for Bombay should be increased. After discussion it was agreed that in the case of the Krishna waters, a different set of proportions should be assumed for discharges above 1,000 T.M.Cft.

Saturday the 28th July, 1951.

9. The engineers met at 10 a.m. to discuss the distribution of waters in the Godavari Basin and arrived at a tentative set of proportions.

10. The Conference assembled at 11.30 a.m. It considered proposals made by the engineers regarding the Godavari. The engineers were requested to prepare a memorandum of agreement and the Conference adjourned till 3.30 p.m.

11. The Conference reassembled at 3.30 p.m. and proceeded to consider the draft memorandum sentence by sentence. As regards Section I, Hon'ble Shri N. V. Gadgil stated that the proportions for the Krishna waters worked out on the previous day were not equitable as they would prejudice the development of the economically backward areas he mentioned and these areas were entitled to a larger share. After some discussion in which the representatives of Madras, Hyderabad and Bombay took part, the conference agreed to a modification of the proportions of distribution for the Krishna waters—Bombay's share being increased by 4 per cent, 2 per cent being surrendered by Hyderabad and 2 per cent by Madras.

12. The basis of distribution for the Krishna and the Godavari waters agreed to at the conference is shown in the annexed memorandum of agreement as finally agreed to by the conference.

MEMORANDUM OF AGREEMENT

I.—THE KRISHNA

The dependable annual flow in the Krishna basin based on the recorded gaugings at Vijayawada is accepted as 1715 T.M.Cft. This figure may have to be increased to allow for any omissions in respect of existing utilisations in any State.

Shri Venkatachari's statement that the actual flow will be in excess of the recorded gauged flow by 8 per cent is noted.

2. The existing utilisations (subject to corrections mentioned in para 1) plus flows required for projects under construction in the concerned States, as stated below, are hereby allocated to the respective States :—

	T.M.Cft.
Bombay	176
Hyderabad	180
Mysore	98.5
Madras	290
	744.5

3. The balance of flow for new projects, after meeting the above allocations works out to 970.5 T.M.Cft. For purposes of allocation, this has been taken as 1,000 T.M.Cft. For this balance upto 1,000 T.M.Cft. the allocations are made as hereunder:—

	Per cent	T.M. Cft.
Bombay	24	240
Hyderabad	28	280
	Per cent	T.M. Cft.
Mysore	1 (Provisional)	10
Madras	47	470

For balance flow in excess of 1,000 T.M.Cft. mentioned above, the allocations will be as follows :—

	Per cent
Bombay	30
Hyderabad	30
Mysore	1 (Provisional)
Madras	39

The allocation to Mysore may have to be slightly adjusted to the extent of additional 1 per cent as a result of further engineering scrutiny. This addition will come out of the share of Madras.

4. The above allocations are subject to the condition that the diversion of supplies across the western ghats for the Koyna Project will be limited to 67.5 T.M.Cft.

II.—THE GODAVARI

The dependable annual flow in the Godavari basin based on the recorded gaugings at Dowlaishwaram is taken as 2,500 T.M.Cft.

2. The existing utilisations plus supplies required for projects under construction in the concerned States

as stated below are hereby allocated to the respective States:—

	Percent	T.M. Cft.
Bombay	..	57
Hyderabad	..	208
Madhya Pradesh	..	30
Madras	..	300
TOTAL		595

3. Of the balance flow of 1,905 T.M.Cft. (say 1,900) which remains available after meeting the allocations in para 2, the allocations to the various States will be as below:—

	Per cent	T.M.Cft.
Bombay	3	57
Hyderabad	26	494
Madhya Pradesh	24	456
Madras	47	893
		1900

These percentages will apply whether the supplies are in excess or short of the dependable flow assumed above.

III.—GENERAL

The allocations in the case of the Krishna and the Godavari have been made on an annual basis. The new utilisations have to be so adjusted as not to interfere with the existing daily utilisation for existing works and agreed utilisation for new works.

2. The use of water passed by one State for her use downstream, out of the share allocated to her and passing through the reservoir of another State may be used by the latter State, solely for power purposes, provided that such quantities are not impounded in their passage through the reservoir for more than the period agreed upon between the Governments concerned, which agreement shall not be unreasonably withheld.

3. The allocations made under parts I and II shall be reviewed after 25 years.

4. No major project shall be undertaken for construction by any State unless it has been fully investigated and necessary detailed estimates have been prepared, and duly examined.

CHAPTER V

Disputes concerning the Tungabhadra

The Tungabhadra river and river valley :—Prior to 1947, the river Tungabhadra had its catchment area in the States of Mysore and Hyderabad and the Provinces of Madras and Bombay. Small portions of its catchment area lay within the States of Sangli, Sandur, Savanur, Miraj (Senior), Miraj (Junior) and Banaganapalle.

Before Independence, about 11,636 square miles of the Tungabhadra catchment fell within the old Mysore State. Now, 22,011 square miles of the catchment lie within Mysore and 5,563 square miles lie within Andhra Pradesh.

Formerly, the united Tungabhadra after the junction of the Tunga and the Bhadra ran in Mysore for a length of 40 miles, formed the boundary between Mysore and Bombay for a length of 35 miles, the boundary between Madras and Bombay for 62 miles, and the boundary between Madras and Hyderabad for the next 192 miles. The Tungabhadra now runs for 237 miles in Mysore, forms the boundary between Mysore and Andhra Pradesh for 36 miles and runs for the next 57 miles in Andhra Pradesh.

Agreements concerning Tungabhadra waters :

From time to time there were the following agreements concerning the Tungabhadra waters:—

(a) agreement of 1892 between Madras and Mysore (1);

(b) agreement of 1933 between Madras and Mysore (2);

(c) agreement of June 1944 between Madras and Hyderabad (3);

(d) agreement of July 1944 between Madras and Mysore (4);

(e) supplemental agreement of December 1945 among Madras, Mysore and Hyderabad (5); and

(f) supplemental agreement of 1946 among Madras, Mysore and Hyderabad (6).

Copies of the agreements are appended to this Report.

Agreements of 1892 *and* 1933, *Issue IV* :—The agreements of 1892 and 1933 between the Governments of Madras and Mysore imposed restrictions concerning irrigation works on the Tungabhadra, the Tunga, the Bhadra, the Vedavathi and their tributaries and several rivers outside the Krishna basin. The agreements so far as they related to the rivers outside the Krishna basin are not the subject-matter of these proceedings.

The effect of clauses 10 and 11 of the agreement of July 1944 between Madras and Mysore was that the agreements of 1892 and 1933 were abrogated so far as they related to the Tungabhadra, the Tunga and the Bhadra and they continued to subsist so far as they related to the Vedavathi only. This is conceded by all the concerned parties.

Mysore contended that in the events which happened after July 1944, the two agreements had wholly ceased to be operative. Andhra Pradesh disputed this contention. Accordingly, the following issue was raised:—

Issue IV: "Are the Agreements of 1892 and 1933 so far as they relate to the river Krishna and its tributaries subsisting and, if so, with what effect? Did they survive on the merger of the princely State of Mysore in the Republic of India? Have they ceased to be operative on the reorganisation of States?" Maharashtra is not interested in this issue.

(1) APK II pp. 144—159.
(2) APK II pp. 160—163.
(3) APK II pp. 164—167.
(4) APK II pp. 168—174.
(5) MYDK II pp. 401—402.
(6) APDK V pp. 31—35.

On the 2nd September, 1971, the States of Mysore and Andhra Pradesh filed the following agreed statement regarding Issue IV and protection to irrigation works in their respective territories in the Vedavathi sub-basin:—

"It is agreed between the State of Mysore and the State of Andhra Pradesh that the State of Mysore will not put up any new work on the streams mentioned in Schedule (1) within the limits shown in the said Schedule and marked in the map* appended herewith, without the previous consent of Andhra Pradesh to protect the irrigation interests under the existing irrigation works in Andhra Pradesh and similarly it is agreed that the State of Andhra Pradesh will not put up any new work on the streams mentioned in Schedule (2) within the limits shown in the said Schedule and marked in the map* appended herewith, without the previous consent of Mysore State to protect the irrigation interests under the existing irrigation works in Mysore State.

It is further agreed between the State of Mysore and the State of Andhra Pradesh that the State of Mysore will not put up any new construction on Suvarnamukhi river so as to affect the supply of Agali tank in Andhra Pradesh for the irrigation of an ayacut of 884 acres, the supplies for which are drawn from the Agali Anicut in Mysore State.

Having regard to this concession the parties are agreed that the Tribunal need not decide issue No. IV."

SCHEDULE-1

List of streams on which no new constructions should be undertaken by the State of Mysore without the previous consent of Andhra Pradesh

Sl. No.	Name of the Stream or Catchment	Location in the Map	Limits within which no new construction should be undertaken by Mysore without the previous consent of Andhra Pradesh
1.	Hagari (Vedavathi)	A	From Vanivilas Sagar in Mysore upto Bhairavanithippa Dam in Andhra Pradesh.
2.	Dodderi tank halla (Garanihalla)	B	4½ miles up-stream of confluence with Hagari.
3.	Talak tank halla (Garanihalla)	C	From the Salem-Bellary road bridge over this stream upto confluence with Hagari.
4.	Chinnahagari	D	Upto 16 miles upstream from Mysore—Andhra Pradesh boundary.
5.	Amarapuram tank catchment	E	Catchment of Amarapuram tank in Mysore State.
6.	Virapasamudram tank catchment	F	Catchment of Virapasamudram tank in Mysore State.
7.	Yeradkere tank catchment	G	Catchment of Yeradkere tank in Mysore State.
8.	Rangasamudram tank catchment	H	Catchment of Rangasamudram tank in Mysore State.
9.	Nagalapuram tank catchment	I	Catchment of Nagalapuram tank in Mysore State.

SCHEDULE-2

List of Streams on which no New constructions should be undertaken by the State of Andhra Pradesh, without the previous consent of Mysore

Sl. No.	Name of the Stream	Location in the Map	Limits within which no new construction should be undertaken by Andhra Pradesh without the previous consent of Mysore State
1	2	3	4
1.	Madalur Doddakere nala	J	Entire catchment of the nala in Andhra Pradesh.
2.	Madalur Gidagana halli Katte nala	K	Entire catchment of the nala in Andhra Pradesh.
3.	Doddabanagere Doddakere nala	L	Entire catchment of the nala in Andhra Pradesh.
4.	Dharmapur tank nala	M	Entire catchment of the nala in Andhra Pradesh.
5.	Parasurampur Doddakere nala	N	Entire catchment of the nala in Andhra Pradesh.

*See Map II in Volume IV of the Report.

1	2	3	4
6.	Kadehoda Achuvali kere nala	O	Entire catchment of the nala in Andhra Pradesh.
7.	Parasurampura tank nala	P	Entire catchment of the nala in Andhra Pradesh.
8.	Gowripura Palyadakere nala	Q	Entire catchment of the nala in Andhra Pradesh.
9.	Jajur tank nala	R	Entire catchment of the nala in Andhra Pradesh.
10.	Thippareddihally Kyatanakere nala . . .	S	Entire catchment of the nala in Andhra Pradesh.
11.	Oblapur tank nala	T	Entire catchment of the nala in Andhra Pradesh.
12.	Hagari (Vedavathi)	U	Below Bhairavanithippa Dam upto Andhra Pradesh-Mysore border.
13.	Chinnahagari	V	From Mysore-Andhra Pradesh border upto its confluence Vedavathi (Hagari).

On the 23rd October, 1972, the States of Mysore and Andhra Pradesh filed the following supplemental agreed statement concerning issue IV:—

> "The State of Andhra Pradesh and the State of Mysore submit that in the agreement of 2nd September, 1971, filed before this Hon'ble Tribunal it is specifically stated that the parties agreed that this Hon'ble Tribunal need not decide Issue No. IV. In view of this the validity or the effect of the agreements of 1892 and 1933 need not be decided in these proceedings. The State of Andhra Pradesh and the State of Mysore do not rely on the agreements of 1892 and 1933 for any relief in these proceedings or any other proceedings relating to the allocation of the Krishna waters."

Having regard to the above concessions we do not decide Issue IV. The States of Mysore and Andhra Pradesh jointly pray that the Tribunal should give suitable directions regarding protection to irrigation works in the Vedavathi sub-basin in accordance with the agreed statement of September 2, 1971. The State of Maharashtra does not oppose this prayer.

On a consideration of all relevant materials before us we propose to direct that the regulations set forth in Annexure 'A' to our final Order regarding protection to the irrigation works in the respective territories of the States of Mysore (now known as Karnataka) and Andhra Pradesh in the Vedavathi sub-basin be observed and carried out.

Agreements of June 1944 *and July* 1944 *and Supplemental agreements of December* 1945 *and* 1946 [*Issue III and IV (A)*] :

In June 1944, the Governments of Madras and Hyderabad entered into an agreement for the partial utilisation of the Tungabhadra waters. The immediate object of the agreement was to enable the two Governments to start the construction of the Tungabhadra Project at Mallapuram. The necessity of a storage project on the Tungabhadra for purposes of irrigation was felt for a long time(7).

In July 1944, the Governments of Madras and Mysore entered into an agreement in regard to sharing of the waters of the Tungabhadra river. The immediate object of the agreement of July, 1944 was to enable the Mysore Government to construct the multipurpose project at Lakkavali on the Bhadra river.

The project was under investigation for a long time and took its final shape in 1939(8). Part I of the agreement related to the sharing of the waters of Tungabhadra. Part II of the agreement related to the royalty payable to the Government of Madras for use of the waters of the Cauvery at Sivasamudram. The agreement so far as it related to Sivasamudram royalty is not the subject matter of these proceedings.

In December 1945 and 1946, the Governments of Hyderabad, Mysore and Madras entered into supplemental agreements modifying the agreements of June 1944 and July 1944 in certain respects.

On the 6th January, 1970, Counsel for Andhra Pradesh stated: "Andhra is not claiming any relief for past breaches of 1944 agreement." Accordingly, no issue was raised on the question of breaches of the July 1944 agreement.

Andhra Pradesh claimed that it was entitled to enforce the agreements of June 1944 and July 1944 against Mysore. Mysore contended that the agreements were not enforceable. Accordingly, the following issues were raised:—

> Issue *III* : Is the agreement of July 1944 valid and subsisting and, if so, with what effect?

(7) Report of the Tungabhadra Project Low Level Canal Scheme APPK XVIII pp. 1—13.
(8) Bhadra Reservoir Project Report MYPK VI p. 11.

Was it invalid as Bombay, Sangli and Hyderabad were not parties to it? Was it rendered ineffective by the Supplemental agreement of 1945? Did it survive on the merger of the Princely State of Mysore in the Republic of India? Has it ceased to be operative on the reorganisation of States?

Issue IV(A) : Did the agreement of June 1944 survive on the :

(i) coming into force of the Indian Independence Act ;

(ii) coming into force of the Constitution of India ; and

(iii) merger of the Princely State of Hyderabad in the Republic of India?

Has the agreement ceased to be operative on the reorganisation of States?

On October 23, 1972, the State of Mysore and Andhra Pradesh filed the following agreed statement concerning Issues III and IV(A):

"Issues III and IV(A) have been raised relating to the waters of the Tungabhadra river. The States of Andhra Pradesh and Mysore are agreed that in the events that have happened it is not necessary to decide these issues as this Hon'ble Tribunal has general jurisdiction in the matter of equitable distribution of waters of the river Krishna (including the waters of the Tungabhadra river) between the States of Andhra Pradesh, Maharashtra and Mysore. The States of Andhra Pradesh and Mysore accordingly pray that this Hon'ble Tribunal may be pleased not to answer the said Issues III and IV(A)".

The State of Maharashtra does not oppose this prayer.

Accordingly, we have to make equitable distribution of the waters of the river Krishna including the waters of the Tungabhadra in the exercise of our general jurisdiction and we are not called upon to decide Issues III and IV(A).

Supersession of older agreements concerning the Tungabhadra waters

The State of Mysore contended that the agreements of 1892, 1933, June 1944 and July 1944 were invalid and/or had ceased to be operative, while the state of Andhra Pradesh argued that they were valid and still operative. Even assuming that these agreements were valid and still subsisting, they as also the supplemental agreements of December 1945 and 1946 have now lost all vitality and should be superseded in view of the equitable allocation of the Krishna waters including the Tungabhadra waters and the agreed statements filed by the parties before us from time to time.

Accordingly, our final order will contain the following directions:—

"This order will supersede:

(i) the agreement of 1892 between Madras and Mysore so far as it related to the Krishna river system;

(ii) the agreement of 1933 between Madras and Mysore so far as it related to the Krishna river system;

(iii) the agreement of June 1944 between Madras and Hyderabad;

(iv) the agreement of July 1944 between Madras and Mysore in so far as it related to the Krishna river system;

(v) the supplemental agreement of December 1945 among Madras, Mysore and Hyderabad;

(vi) the supplemental agreement of 1946 among Madras, Mysore and Hyderabad."

On the 17th August, 1973, the States of Andhra Pradesh and Mysore through their respective counsel stated that, without prejudice to their respective contentions, they agreed to the above order. Learned Counsel for the State of Maharashtra stated that the State of Maharashtra did not object to the incorporation of the above clause in our final Order.

Tungabhadra Project

The Tungabhadra Project consists of the following components:—

(a) masonry dam across the Tungabhadra river near Mallapuram for impounding 133 T.M.C. of water (gross);

(b) Left Bank Low Level Main Canal 127 miles long with 14 miles branch canal at tail and Left Bank High Level Canal 9.5 miles long, all in the district of Raichur;

(c) Right Bank Low Level Main Canal 217 miles in length in Bellary and Kurnool Districts ;

(d) Right Bank High Level Canal 116 miles in length running through Bellary and Anantpur Districts in the first stage and extending to the Cuddapah District in the second stage ;

(e) net work of distributaries emanating from the canals ;

(f) power house on right side of the dam ;

(g) power house on Right Bank Low Level Canal at Hampi ; and

(h) power house on left side of the dam at Munirabad.

The agreement of June 1944 enabled the Madras and Hyderabad Governments to start construction of the Tungabhadra Project after the conclusion of the Second World War. The Project came under the purview of three successive Five Year Plans.

The Project was intended to irrigate areas on the left and right banks of the river Tungabhadra. In 1944, the left side fell within the dominion of the Nizam of Hyderabad. The right side fell within the Province of Madras in British India.

Upon the Constitution coming into force in 1950, the States of Hyderabad and Madras respectively continued to be in charge of the left and right sides of the Project.

On the passing of the Andhra State Act, 1953, as from the 1st October 1953, the Madras part of the project was divided between the States of Mysore and Andhra. Half of the dam, the right side headworks and the Right Bank Canal up to the 96th mile fell within the limits of Mysore State and the remainder of the canal fell within Andhra State. The main canal after it entered Andhra fed branches which re-entered Mysore. The left side of the project continued to be in charge of the State of Hyderabad.

Upon the coming into force of the States Reorganisation Act, 1956, as from the 1st November, 1956, the control of the left side of the project became vested in the State of Mysore.

Section 66 of the Andhra State Act

Section 66 of the Andhra State Act, 1953 made special provisions with regard to the devolution of the rights and liabilities of the State of Madras in relation to the Tungabhadra Project and the administration thereof. Sub-section (4) of section 66 authorised the President to give directions with regard to the matters specified in the section and, in particular, for the completion of the project and its operation and maintenance thereafter. Only the President can issue directions under sub-section (4) of section 66.

Tungabhadra Board

By a notification issued on the 29th September, 1953,(9) in pursuance of sub-section (4) of section 66 of the Andhra State Act, the President of India established the Tungabhadra Board consisting of a Chairman appointed by the Central Government and Chief Engineers, Irrigation and Electricity of Andhra, Mysore and Hyderabad, as members. Paragraph 5(1) of the notification provided :

> "The Board shall take charge of and deal with, all matters relating to works on or connected with the Tungabhadra Project which are common to both the States of Andhra and Mysore, but nothing in this sub-paragraph shall be deemed to authorise the Board to deal with any matter in respect of works which relate to only one of the States or in which only one State is interested."

The Board was given certain powers of a Chief Engineer of Madras, but the powers of Government were to be exercised by the Central Government. This arrangement did not prove satisfactory. On the 10th of March, 1955(10) the Board was reconstituted with effect from the 15th March, 1955. The reconstituted Board, which consisted of a whole-time Chairman and four members each representing the Government of India and the Governments of Andhra Pradesh, Mysore and Hyderabad, was given certain powers of a State Government.

The Tungabhadra Board was reconstituted in 1956. The reconstituted Board consists of a Chairman and three members each representing the Government of India, Andhra Pradesh and Mysore.

(9) Government of India, Ministry of Irrigation and Power, Notification No. DW II-22 (129) dated the 29th September, 1953.
(10) Government of India, Ministry of Irrigation and Power, Notification No. DWVI 4(9) dated the 10th March, 1955.

The Tungabhadra Board administers and controls the right half of the dam, common portions of the Right Bank Low Level and High Level Canals and the two power houses on the right side. The Mysore Government administers and controls the left half of the dam, the Left Bank Low Level and High Level Canals and the Munirabad Power House on the left side.

In consequence of the States Reorganisation Act, 1956, the Hyderabad portion of the Tungabhadra Project on the left side vested in Mysore. The existing arrangement on the right side continued.

Tungabhadra dam(11)

The construction of the dam was inaugurated by the Governments of Hyderabad and Madras on the 28th February, 1945. It was decided that the work relating to the dam would be divided into two halves, the right half to be executed by Madras and the left half by Hyderabad, each side undertaking the canal work within its territories.

The dam was formally opened in 1953 and completed in 1956.

The Tungabhadra reservoir has a number of outlets for low level canal irrigation and power sluices, high level canal sluices, water supply sluices and river outfall sluices on both left and right banks, river sluices and sluices for existing irrigation (Raya and Basavanna channels) on the right bank.(12)

The water drawn through the penstocks on the right bank is used for generation of power in the dam power house. The tail-race water is discharged into the power canal which runs for about 14 miles and empties into a forebay at Hampi. The water drawn through the penstocks at the dam power house which is in excess of the requirements of the power canal is discharged into the river through river outfall sluices.

The water from the forebay at Hampi is drawn through penstocks for generation of power in the Hampi power house. The tail-race water then joins a small tail-race pond formed across the natural stream known as Gundalkeri Vanka. Most of the tail-race water is discharged into the Right Bank Low Level Canal through head sluices of the canal and a small portion is discharged into the Vanka through river outfall sluices. The Vanka joins the Tungabhadra river about 2 miles below the regulator.

Similarly, on the left side, the water required for irrigation is primarily drawn through penstocks and let into the left bank main canal, the excess being surplused to the river through river outfall sluices. It is possible to draw the water through irrigation sluices also as a stand-by, when power house is shut down partly or wholly. However these are not required generally to be operated, in view of the fact that, most of the time, withdrawals from penstocks are sufficient for irrigation requirements.

Left Bank Canals(13).—The left bank canals are :

(1) Left Bank Low Level Main Canal 127 miles long with 14 miles long branch canal at tail.

(2) Left Bank High Level Canal 9.5 miles in length.

Both the canals serve Raichur District of Mysore and are under the exclusive control of the Mysore Government.

Right Bank Canals.—The Right Bank Low Level Canal is 217 miles long and is intended to irrigate areas in Bellary and Kurnool Districts. The jurisdiction of the Tungabhadra Board extends upto 155 miles of the Right Bank Low Level Canal. The rest of the Canal is in charge of Andhra Pradesh. The construction of the Canal commenced in February 1945 and was completed in 1957. The Canal started operation in 1953.

The Right Bank High Level Canal is 116 miles long, the first 68 miles 6 furlongs running in Mysore and the rest in Andhra Pradesh. Mysore and Andhra agreed to entrust execution of the common works to the Tungabhadra Board at a conference held on the 18th June, 1956. The joint scheme of Mysore and Andhra Pradesh was approved by the Planning Commission on the 3rd November, 1958. The Board is in charge of the construction, maintenance and operation of about 68 miles 6 furlongs of the main Canal up to Mysore State limits. The rest of the main Canal is in charge of Andhra Pradesh. Construction of the Canal started in 1957-58. The Canal commenced

(11) See also discussion under issue IV (B) (a) IV(B) (b) (i).

(12) KGCR Ann. IX p. 17, MY Note No. 35.

(13) Disputes concerning the Left Bank canals are dealt with under issues II (3), IV (B) (b) (i) and V(b) (ii).

operation in 1967. Construction work of the distributaries is still under progress and is in charge of the respective State Governments.

On the 22nd January, 1971, the States of Mysore and Andhra Pradesh made the following joint statement(14) before the Tribunal :—

"The States of Andhra Pradesh and Mysore state that the benefits of the following projects are shared between the two States as mentioned hereinbelow :—

(a) Tungabhadra Project Right Bank Low Level Canal.

Andhra Pradesh . . .	24	T.M.C.
Mysore	19	T.M.C.

(b) Tungabhadra Project Right Bank High Level Canal.

Andhra Pradesh . . .	32.5	T.M.C.
Mysore	17.5	T.M.C.

Reservoir losses in respect of the above canals on the right side are shared as mentioned below :—

Andhra Pradesh	5.5 T.M.C.
Mysore	3.5 T.M.C."

On the 7th May, 1971, all the States filed an agreed statement that the following projects and the quantum of their utilisation and evaporation losses as mentioned below should be protected :—

Name of Project	Name of State benefited	Quantum of utilisation T.M.C.	Evaporation losses T.M.C.	Total T.M.C.
1	2	3	4	5
Tungabhadra Right Bank Low Level Canal	Mysore	19.00	3.50	22.50
—do—	Andhra Pradesh	24.00	5.50	29.50
Tungabhadra Right Bank High Level Canal Stages I & II.	Mysore	17.50	nil.	17.50
—do—	Andhra Pradesh	32.50	nil.	32.50

Reservoir loss.—The annual reservoir loss of the Tungabhadra reservoir was estimated to be 18 T.M.C.(15). Originally in 1942(16) it was contemplated that the reservoir loss would be allocated to Madras and Hyderabad in respect of their works on the left and right sides of the reservoir in proportion to their respective draw-offs. The Tungabhadra Project scheme finally formulated for execution as a joint scheme of Hyderabad and Madras contemplated that the total annual reservoir loss estimated to be 18 T.M.C. would be equally shared by the left and right sides and, out of 9 T.M.C. to be shared by the right side, the shares of Andhra Pradesh and Mysore would be 5.5 to 3.5 T.M.C. respectively(17). Accordingly, on the 22nd January, 1971, the parties agreed that the reservoir loss of 9 T.M.C. in respect of the Right Bank Low Level and High Level Canals would be shared as follows : Andhra Pradesh 5.5 T.M.C., Mysore 3.5 T.M.C. It was also common case before us in the list of projects filed on the 7th May 1971(18) that the evaporation loss of 9 T.M.C. under the Tungabhadra Left Bank Low Level Canal should be protected and such protection has been given by us accordingly.

Counsel for the State of Mysore while closing his argument on the 23rd August, 1973 urged that the evaporation loss of the reservoir could be debited equally to the left and right sides provided the utilisations were also ensured to be equal on either side. He argued that the sharing of 9 T.M.C. of evaporation losses by the Tungabhadra Left Bank Low Level Canal was conditional upon equal utilisation by the left and right sides. We are unable to accept this argument. We find no trace of this condition either in the agreed statement of the 22nd January, 1971, or in the list of projects filed on the 7th May, 1971.

(14) This statement is in accordance with earlier statements and agreements, see supplement to the Report of the Tungabhadra Low Level Canal Scheme 1942, APPK XIX, pp. 2-3; Summary record of the conclusions reached at the inter-State conference on the 5th and 6th October, 1957, APPK IX pp. 2-11 at p. 7; Project report on the Tungabhadra Project High Level Canal distribution system, Mysore portion, MYPK VI p. 3.

(15) See KGCR Ann. IX p. 16, see also Report of the Tungabhadra Project 1942, Low Level Canal Scheme (Government of Madras) Vol. I, pp. 45, 47, APPK XVIII pp. 45,47.

(16) Report of the Tungabhadra Project 1942, Low Level Canal Scheme (Government of Madras) Vol. I, p. 47, APPK-XVIII, p. 47

(17) Supplement to the Report of the Tungabhadra Low Level Canal Scheme (Government of Andhra Pradesh), pp. 1,3, APPK XIX pp. 1,3.

(18) MRDK VIII p. 65.

We are informed by the State of Mysore now known as the State of Karnataka that the annual reservoir loss of Tungabhadra reservoir though estimated to be 18 T.M.C. actually varies from year to year.

On a consideration of all relevant factors, we propose to give the following directions :—

> "The reservoir loss of Tungabhadra reservoir shall be shared equally by the works of the State of Karnataka on the left side and the works on the right side of the reservoir. The half share of the right side in the reservoir loss shall be shared by the States of Andhra Pradesh and Karnataka in the ratio of 5.5 to 3.5."

We think that the above direction is just and equitable under the current conditions of utilisation of the waters of the Tungabhadra reservoir. If the conditions materially change in the future, this direction may be altered when our decision is reviewed.

Powers Houses on right side.—The dam power house on the right side has four generating units of 9,000 kW each. The power house on Right Bank Canal at Hampi has four generating units of 9,000 kW each. The two power houses are in charge of the Tungabhadra Board. The States of Andhra Pradesh and Mysore agreed to share their benefits in the ratio of 4 to 1.(19)

Munirabad Power House(20).—The Munirabad Power House on the left side is in charge of the Mysore Government.

Release of waters from Tungabhadra Dam, Issue IV(B) (a).—Andhra Pradesh contended that the following quantities of water should be released by way of regulated supplies from the Tungabhadra reservoir :—

(1) 58 T.M.C. for the requirements of Kurnool Cuddapah Canal.

(2) 8.5 T.M.C. by way of assistance to Rajolibunda Diversion Scheme.

(3) 26 T.M.C. as contribution to the Krishna for the benefit of irrigation lower down the Krishna river.

Mysore disputed the claim.(21)

Accordingly, the following issue was raised : —

Issue IV(B)(a).—"Should any directions be given for the release of waters from the Tungabhadra Dam—

(i) for the benefit of the Kurnool Cuddapah Canal ;

(ii) for the benefit of the Rajolibunda Diversion Scheme ; and

(iii) by way of contribution to the Krishna river ?"

The Madras-Hyderabad agreement of June 1944 contemplated release of supplies from the Tungabhadra reservoir for meeting the needs of new and pre-Moghul irrigation, giving assistance to the Kurnool Cuddapah Canal and Rajolibunda Canal and by way of contribution to the Krishna for the requirements of Krishna irrigation.(22)

The Rajolibunda Diversion Scheme is based on river flow and assistance from Tungabhadra Dam.(23)

Sir Arthur Cotton considered Kurnool Cuddapah Canal to be a part of the complete Tungabhadra Project.(24) The Khosla Committee Report(25) considered that the K.C. Canal had a prior claim on the Tungabhadra waters and that until the Siddheswaram dam was built, the Tungabhadra reservoir should provide 4.35 T.M.C. of water for the requirements of the K.C. Canal of the order of 58 to 60 T.M.C. as proposed by the Committee.

At an inter-State conference in 1959, the Chief Engineers of Mysore and Andhra Pradesh agreed that 26 T.M.C. should be released from the Tungabhadra

(19) Summary record of the conclusions reached at the inter-State conference of Ministers of Andhra Pradesh and Mysore at the Tungabhadra Dam on the 5th and 6th October, 1957 APDK IX p. 10 ; MRDK XII Sheet XIII (3).

(20) Disputes concerning the Munirabad Power House are dealt with under Issue IV(B) (b) (iii) IV (B) (c) and IV (B) (d).

(21) SP III pp. 6-9, 12.

(22) APK II pp. 164-167.

(23) KGCR Ann. IX p. 27 : Report of Rajolibunda Diversion Scheme (Hyderabad) APPK XVI p. 2.

(24) Note of T. Highham on the Tungabhadra and Krishna Projects APDK I p. 21.

(25) Report of the Technical Committee on the optimum utilisation of the Krishna and the Godavari Waters pp. 99-100.

reservoir by way of contribution to the Krishna. They accepted the principle that some assistance to the pre-Moghal channels and the Rajolibunda and K.C. Canals should be given from the Tungabhadra reservoir. While the Andhra Pradesh Chief Engineer was of the view that assistance to the extent of 18 T.M.C. and 8.5 T.M.C. should be given to the K.C. Canal and the Rajolibunda Canal respectively, the Mysore Chief Engineer said that assistance to a limited extent only could be given. The two Chief Engineers also accepted the principle that the following priorities should be adopted for sharing the waters of the Tungabhadra reservoir (1) Pre-Moghul channels, (2) Krishna contribution, (3) assistance to the K.C. Canal, (4) assistance to the Rajolibunda Left Bank Canal. However, no final agreement was reached between the Secretaries and Ministers of the two States.(26)

On October 23, 1972, the parties jointly made the following statement :—

> "As regards issue IV(B)(a) the States of Andhra Pradesh and Mysore are agreed that the question of giving directions in respect of matters referred to in sub-clauses (i), (ii) and (iii) of Clause IV(B)(a) be decided by this Hon'ble Tribunal in the exercise of its general jurisdiction relating to the equitable distribution of the waters of the River Krishna between the States concerned."

The matters referred to in issue IV(B)(a) will be dealt with accordingly.

Vesting of control and administration of the Tungabhadra dam and reservoir and the main canal on the left side in the Tungabhadra Board, Issue IV(B)(b)(i) :

Andhra Pradesh contends that the control and administration of the Tungabhadra dam and reservoir and the main canal on the left side should be vested in the Tungabhadra Board. Mysore disputes the claim. Accordingly, the following issue was raised :—

> Issue IV(B)(b)(i) "Should any directions be given for the vesting of the control and administration in the Tungabhadra Board of the Tungabhadra Dam and the Reservoir and the main canal on the left side ? Has the Tribunal any power to give such directions ?"

The Tungabhadra Board was established by the President of India under section 66(4) of the Andhra State Act, 1953. No directions have been issued by the President of India under section 66(4) vesting the control of the left side of the Tungabhadra dam and reservoir and the Left Bank Canals in the Tungabhadra Board.

In 1955-56 there was a proposal to vest in the Tungabhadra Board unitary control over the maintenance and operation of the Tungabhadra dam and reservoir and operation of sluices and spillway gates but the proposal was eventually dropped.(27)

On the 22nd August, 1973, the learned Advocate General of Andhra Pradesh conceded that this Tribunal has no power to direct the vesting of the control and administration of the Tungabhadra dam and reservoir and the main canal on the left side in the Tungabhadra Board. But he prayed that we should make suitable recommendations for vesting the control and administration of the entire Tungabhadra reservoir and dam including the spillway, river sluices and penstocks, as also the headworks on both sides and works common to the States of Andhra Pradesh and Mysore in a Joint control body.

In our opinion, there is no ground for taking away the administration and control of the Tungabhadra Left Bank Canals and their headworks from the Mysore Government and vesting them in the Tungabhadra Board or any other joint control body.

At present, the Tungabhadra dam and reservoir are subject to the control and administration of the Mysore Government on the left side and the Tungabhadra Board on the right side. We consider that control over the maintenance and operation of the entire Tungabhadra dam and reservoir and spillway gates on the left and right sides should be vested in a single control body, but this may be done by suitable legislation. Until another control body is established, such control may be vested in the Tungabhadra Board. The control body may be empowered to carry out contour surveys of the entire reservoir from time to time with a view to ascertain whether its storage capacity has been reduced due to silting and prepare revised capacity tables, if necessary.

At present, common working tables of the Tungabhadra reservoir are being prepared from time to time by the Tungabhadra Board and discharges from the reservoir are regulated in accordance with such

(26) SP III pp. 64-65, 105-111, 129.
(27) SP III p. 138-151.

working tables. The existing practice started in 1967-68. The Tungabhadra Board had prepared the working table of the Tungabhadra reservoir from 15-11-1967 to 15-7-1968 in consultation with the Chief Engineers of the States of Mysore and Andhra Pradesh. The Board asked for a direction in this regard from the Central Government. By its letter dated the 13th June, 1968([28]) the Government of India, Ministry of Irrigation and Power, conveyed to the Chairman, Tungabhadra Board, its approval to the operation of the reservoir for the period up to the 15th July, 1968 on the basis of the aforesaid working table. The letter stated that "The arrangement suggested in this working table is purely *ad hoc* and without prejudice to the rights, claims and apportionment of Tungabhadra waters or of the regulation of the Tungabhadra Reservoir in future years". An identical statement is added at the foot of all working tables prepared subsequently by the Tungabhadra Board. We considered that the existing practice with regard to the preparation of the working tables of the Tungabhadra reservoir by the Tungabhadra Board and regulation of discharges from the reservoir in accordance with such working tables should be continued until another control body is established.

The State of Mysore has represented that the Tungabhadra Board should be abolished. The State of Andhra Pradesh wants that the Board should be continued. In our opinion, it is desirable that the Tungabhadra Board should continue to retain charge of works on or connected with the Tungabhadra Project which are common to the two States until another control body, as mentioned above, is established. The State of Mysore has made charges of partiality against the Tungabhadra Board. It will be open to the State of Mysore to make such representation as it thinks fit on this subject to the Government of India.

If a control body for the entire Krishna valley is established, the Tungabhadra Board may be abolished and all the powers of the Tungabhadra Board may be vested in such control body.

Issue IV(B) (b) (i) is answered accordingly.

Vesting of Control of the Rajolibunda headworks and common portion of the canal within Mysore State limits in the Tungabhadra Board. Issue IV(B)(b)(ii) :

Andhra Pradesh contends that the control of the Rajolibunda headworks and the length of the common portion of the canal within Mysore State limits should be vested in the Tungabhadra Board with a view to ensure supply to the irrigation lower down in Andhra Pradesh and to prevent unauthorised abstraction of water in the Mysore reaches of the canal. Mysore disputes the claim and contends that the Tribunal has no power to give such directions.([29]) Accordingly, the following issue was raised :—

> Issue IV(B)(b)(ii) :—Should any directions be given for the vesting of the control and administration in the Tungabhadra Board of the Rajolibunda headworks and the common canals within Mysore State limits ?
>
> Has the Tribunal any power to give such directions ?

Upon the reorganisation of States in 1956, the headworks and the initial 26-27 miles of the canal with an ayacut of 5,900 acres fell within Mysore State and the remaining portion of the canal with an ayacut of 87,000 acres fell within Andhra Pradesh.([30])

At an inter-State conference of Ministers of the States of Andhra Pradesh and Mysore on the 5th and 6th June, 1959, at Bangalore, it was agreed that the existing arrangement for the maintenance of the headworks and the common portions of the Rajolibunda canal and regulation of water by Mysore be continued for a period of one year from the 1st July, 1959, subject to the condition that the regulation of water at the head reach might be done by the Officer concerned in close consultation with the Executive Engineer concerned of Andhra Pradesh or his representative who would be contacting the Mysore Officer at the headworks either on telephone or otherwise. This procedure has been followed ever since.

In October 1959, the Chief Engineers of the two States agreed that there would be a full supply discharge of 850 cusecs at the canal head out of which 770 cusecs would be available at the Mysore-Andhra Pradesh border.([31])

In November 1959, the States of Andhra Pradesh and Mysore agreed that the liabilities on account of the headworks of the Rajolibunda Diversion Scheme would be shared in the ratio of the quantities of the water allocated for use by the two States under the Scheme and that the principles applicable to the allo-

(28) SP III pp. 191-192 (Ex. MYK 383).
(29) SP III pp. 10, 164, 182-183.
(30) SP III p. 132, KGCR Ann. IX p. 27.
(31) SP III p. 103.

cation of liabilities under the Tungabhadra Right Bank Low Level Canal (common portion) should be made applicable to the liabilities under the Rajolibunda Canal.(32)

On the 25th January, 1971, the States of Mysore and Andhra Pradesh made the following joint statement :—

> "The States of Mysore and Andhra Pradesh state that the benefits of utilisations under the existing Rajolibunda Diversion Scheme are shared between the two States, as mentioned herein below :
>
> | | | |
> |---|---|---|
> | Mysore . . . . | 1.2 | T.M.C. |
> | Andhra Pradesh . . . | 15.9 | T.M.C." |

The actual withdrawals and deliveries at the canal head and at Mysore-Andhra Pradesh border were as follows :—

Year June to May	Withdrawals in T.M.C.	
	At canal head(33)	At Mysore Andhra Pradesh border(34)
1	2	3
1961-62	5.70	4.29
1962-63	8.98	6.89
1963-64	10.73	9.61
1964-65	13.98	12.45
1965-66	13.27	11.96
1966-67	17.02	15.08
1967-68	18.18	14.95
1968-69	19.33	15.98

The deliveries at Mysore-Andhra Pradesh border were somewhat irregular and not in conformity with the agreements mentioned above.(35) However, it appears that the ayacut was not fully developed and having regard to the areas irrigated in Andhra Pradesh and their water requirements, Andhra Pradesh did not suffer any real prejudice.(36)

Mysore has installed two minor lift irrigation schemes for which water is pumped from the Rajolibunda canal.(37) The area irrigated under the two schemes is 384 acres. Mysore is at liberty to use its share of the water withdrawn at the canal head for lift irrigation but it has no right to use water in excess of its share.

In September 1968, the Andhra Pradesh Government requested the Central Government to take over the management of the Rajolibunda Diversion headworks and common portion of the canal.(38) The Central Government did not accede to the request.

On the 22nd August 1973, the learned Advocate General of Andhra Pradesh conceded that this Tribunal has no power to direct the vesting of the control and administration of the Rajolibunda headworks and the common canals within Mysore State limits in the Tungabhadra Board. However, he prayed that we should make suitable recommendations for vesting the control and administration of the aforesaid works in a joint control body.

We are of the opinion that, at present, there is no sufficient ground for taking away the administration and control of the Rajolibunda headworks and the common portion of the canal within Mysore State limits and vesting such administration and control in the Tungabhadra Board or any other joint control body.

However, we find it necessary to give directions for the proper sharing of the benefits of utilisations under the Rajolibunda Diversion Scheme between the States of Mysore (now known as Karnataka) and Andhra Pradesh. Accordingly, we propose to give the following direction :—

> The benefits of utilisations under the Rajolibunda Diversion Scheme be shared between the States of Karnataka and Andhra Pradesh as mentioned herein below :—
>
> | | | |
> |---|---|---|
> | Karnataka . . . . | 1.2 | T.M.C. |
> | Andhra Pradesh . . . | 15.9 | T.M.C. |

Issue IV(B)(b)(ii) is answered accordingly.

Other disputes concerning Tungabhadra water :

Other disputes concerning the Rajolibunda Diversion Scheme, the Kurnool Cuddapah Canal and the Bhadra Reservoir Project are considered under Issue II(3).

(32) SP III p. 130.
(33) MYDK XV pp. 11-14.
(34) APDK VI pp. 13-14.
(35) SP III pp. 132-136.
(36) SP IV pp. 35-37; APDK VII p. 20; MRDK VIII,pp. 19-20.
(37) SP IV pp. 4, 36, 49.
(38) SP III pp. 132-137.

CHAPTER VI

Claims arising out of the States Reorganisation Act, 1956

Reorganisation of States : Under Articles 3 and 4 of the Constitution, a law made by Parliament for reorganisation of States may contain such supplemental, incidental and consequential provisions as Parliament may deem necessary. Consequent upon the reorganisation of States from time to time, Parliament considered it necessary to make special provisions with a view to minimise the unsettling effects of a reorganisation on certain irrigation and power projects and inter-State arrangements and agreements. For purposes of the present proceedings, the special provisions contained in section 66 of the Andhra State Act, 1953 and sections 107 and 108 of the States Reorganisation Act, 1956 are relevant. We have considered elsewhere the provisions of section 66 of the Andhra State Act.

Section 107 *of the States Reorganisation Act*, 1956 : The section provides :—

*"*Section* 107. If it appears to the Central Government that the arrangement in regard to the generation or supply of electric power or the supply of water for any area or in regard to the development of any project for such generation or supply has been or is likely to be modified to the disadvantage of that area by reason of the fact that it has been transferred by the provisions of Part II from the State in which the power stations and other installations for the generation and supply of such power, or the catchment area, reservoirs and other works for the supply of water, as the case may be, are located, the Central Government may give such directions as it deems proper to the State Government or other authority concerned for the maintenance, so far as practicable, of the previous arrangement."

Similar provisions are to be found in section 69 of the Bombay Reorganisation Act, 1960 and section 68 of the Punjab Reorganisation Act, 1960, Articles 309 and 310 of the Treaty of St. Germain of October 10, 1919 and other Peace Treaties contained analogous provisions.(1)

Andhra Pradesh claims relief under section 107 in respect of Munirabad Power House on the ground that an arrangement for supply of power to Hyderabad city has been modified by reason of the fact that Hyderabad city was transferred to Andhra Pradesh. We have held that there was no arrangement as alleged and, consequently, no relief under section 107 can be granted. The question whether, assuming there was such an arrangement, the Tribunal can give any relief under section 107 does not, therefore, arise.

Section 108 *of the States Reorganisation Act*, 1956 : The section provides :—

**"108. (1) Any agreement or arrangement entered into between the Central Government and one or more existing States or between two or more existing States relating to—

(a) the administration, maintenance and operation of any project executed before the appointed day, or

(b) the distribution of benefits, such as, the right to receive and utilise water or electric power, to be derived as a result of the execution of such project, which was subsisting immediately before the appointed day shall continue in force, subject to such adaptations and modifications, if any (being of a character not effecting the general operation of the agreement or arrangement) as may be agreed upon between the Central Government and the successor State concerned or between the successor States concerned, as the case

(1) See F.J. Berber, Rivers in International Law 1959 Ed. pp. 59-60.

*Continuance of arrangements in regard to generation and supply of electric power and supply of water.

**Continuance of agreements and arrangements relating to certain irrigation, power or multipurpose projects.

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may be, by the 1st day of November, 1957, or, if no agreement is reached by the said date, as may be made therein by order of the Central Government.

(2) Where a project concerning one or more of the existing States affected by the provisions of Part II has been taken in hand, but not completed, or has been accepted by the Government of India for inclusion in the Second Five Year Plan before the appointed day, neither the scope of the project nor the provisions relating to its administration, maintenance or operation or to the distribution of benefits to be derived from it shall be varied :—

(a) in the case where a single successor State is concerned with the project after the appointed day, except with the previous approval of the Central Government, and

(b) in the case where two or more successor States are concerned with the project after that day, except by agreement between those successor States, or if no agreement is reached, except in such manner as the Central Government may by order direct,

and the Central Government may from time to time give such directions as may appear to it to be necessary for the due completion of the project and for its administration, maintenance and operation thereafter.

(3) In this section, the expression 'project' means a project for the promotion of irrigation, water supply or drainage or for the development of electric power or for the regulation or development of any inter-State river or river valley."

The expression "appointed day" means the 1st day of November, 1956, see section 2(a) of the Act.

The object of section 108 is to minimize the unsettling effect of reorganisation of States on inter-State projects and agreements.(2)

In the present reference, there is no dispute about the scope or interpretation of section 108(1).

The first part of section 108(2) shows that section 108(2) applies to a project concerning one or more of the existing States affected by the reorganisation of States which was taken in hand, but not completed or was accepted by the Government of India for inclusion in the Second Five Year Plan before the appointed day. If there is such a project, neither its scope nor the provisions relating to its administration, maintenance and operation or to the distribution of benefits to be derived from it shall be varied except as provided in the sub-section.

The second part of section 108(2) authorises the Central Government to give necessary directions for the due completion of such a project and for its administration, maintenance and operation thereafter.

Relief under section 108(2) has been claimed in respect of—

(1) release of water from the Koyna Project, Issue V(a)(ii) ;

(2) release of water from a storage dam at Ajra, Issue V(a)(i) ;

(3) extension of the Tungabhadra Left Bank Low Level Canal to Andhra Pradesh, Issue V(b)(ii) ;

(4) extension of a project on the Bhima in Mysore to Andhra Pradesh, Issue V(b)(iii) ;

(5) extension of the Upper Krishna Project to Andhra Pradesh, Issue V(b)(i) ; and

(6) sharing of power generated at the Munirabad Power House, Issue IV(B).

For reasons to be given hereafter, we have held that no grounds for relief under section 108(2) have been made out in respect of any of the projects. Accordingly, the question what relief could be granted by the Tribunal if such grounds were established does not arise. The second part of section 108(2) authorises only the Central Government to issue the directions mentioned therein.

We now proceed to discuss the projects in respect of which relief is claimed under section 107 and/or section 108 of the States Reorganisation Act, 1956.

(2) Report of the States Reorganisation Commission 1955, pp. 54-56, 224, 254.

(1) *Release of water from the Koyna Project. Issue V(a)(ii)* :

Koyna Hydro-electric Project Stages I and II : Stage I of the Koyna Hydro-electric Project as envisaged in the project report of December 1952(3) and sanctioned by the Bombay Government on the 20th February, 1953(4) provided for power generation only and a storage of 36 T.M.C. of water. The Project was inaugurated in January 1954. Some details of Stage I were modified by the project reports of March, 1956 and October, 1956. Stage I as envisaged in the report of October 1956 was approved by the Bombay Government on the 17th January, 1957(5) and was cleared by the Planning Commission.(6)

The construction of Stage I was planned so as to facilitate the work of Stage II. Consequently, the estimate of Stage I provided for construction of a spillway of full width in foundation and superstructure required for Stage II to store 98.7 T.M.C., irrigation sluices, penstock pipes and other works needed for Stage II.(7)

Stage II of the Project as envisaged in the project report of July 1960 provided for the construction of works relevant to the storage of 73 T.M.C. of water upto the crest level of the spillway and use of 67.5 T.M.C. for power generation and 16 T.M.C. for irrigation in South Stara District.(8) Stage II of the Project was cleared by the Planning Commission in April 1961 subject to the condition that westward diversion of water would be limited to 67.5 T.M.C. of water per annum and consumptive use of the water let down eastwards from the reservoir would not be made without the approval of the Government of India.(9) In January 1962, the Planning Commission sanctioned the thickening of the Koyna dam relevant to a storage of 98 T.M.C. and raising of the height of the dam for full reservoir level 2158.5 on condition that the proposal did not involve any change in the scope of the project in regard to the maximum westward diversion of water or the consumptive use for irrigation.(10) In July 1962, the Maharashtra Government gave administrative sanction to the estimate of Stage II.

Offer of storage of water in the Koyna Dam for irrigation in Bijapur District :

In May 1958, the Bombay Government offered to provide storage of 25.53 T.M.C. of water in the Koyna dam for lift irrigation in Bijapur District of Mysore on condition that the Mysore Government would pay the cost of the extra storage.(11)

However, lift irrigation in Bijapur was not economically feasible without the supply of cheap power from the Koyna Project. As the Bombay Government declined to supply the power, the Mysore Government was unwilling to pay the cost of the extra storage and they intimated that, while they reserved their right to utilise Koyna waters to the extent of 46 T.M.C., they did not presently ask for any storage in the Koyna dam.(12)

In 1958, the Bombay Government had stated that the storage of 25.53 T.M.C. of water in the Koyna dam for lift irrigation in Bijapur could be provided at a later date on payment of extra cost by the Mysore Government. In 1962, the Mysore Government requested the Maharashtra Government to provide storage for their Upper Krishna Project to irrigate Bijapur District. The Maharashtra Government declined to comply with the request. An appeal to the Governmnet of India to provide the storage was unsuccessful.(13)

Issue : Mysore contends that the Koyna Hydro-Electric Project which was taken in hand by the Bombay Government but not completed before the 1st November, 1956 contemplated lift irrigation in Bijapur District.(11) Upon the reorganisation of States, Koyna remained within the State of Bombay and Bijapur District became part of the reorganised Mysore State. In view of section 108(2) of the States Reorganisation Act, 1956, the scope of the Project and distribution of its benefits cannot be varied and consequently Maharashtra as the successor of Bombay State is bound to release water from the

(3) December, 1952 Report, pp. vi, vii, 6, 45.
(4) MYDK II pp. 365-379.
(5) MRDK VI pp. 96-104.
(6) MR Note No. 16; First Five Year Plan p. 351, Second Five Year Plan, pp. 333, 366.
(7) December, 1952 Project Report, pp. 33, 34; Report of the COPP Irrigation and Power Team on Koyna Project, p. 29.
(8) July, 1960 Project Report, p. 4.
(9) MRDK VI pp. 107-108.
(10) APK II p. 118; MRDK I pp. 161-163.
(11) MYDK II pp. 386-388.
(12) MYDK II pp. 389-392; MRDK VI pp. 47-60, 63-64, 94.
(13) MYDK I pp. 175-195; MYDK XIX pp. 63-70.
(14) MYK I, pp. 46-48 MRK IV, pp. 35-39; MYK IV, pp. 23-24; MYDK I p. 183-SP I pp. 133-134.

Koyna storage for irrigating lands in Bijapur District. Maharashtra disputes the contention. The following issue was raised :—

Issue V(a)(ii) : Should any direction be given for release of waters by Maharashtra for the benefit of Mysore from Koyna Valley Irrigation-*cum*-Hydro-electric Project ?

Claim for relief under section 108(2) *of the States Reorganisation Act is not established* : Stage I of the Koyna Hydel Project which was taken in hand but not completed before the 1st November, 1956 envisaged power production only. Irrigation in Bijapur District was not within the scope of Stage I as alleged.

Some works relevant for Stage II were undertaken in Stage I, but before the 1st November, 1956, the construction of the additional storage or the excavation of canals required for irrigation was not taken in hand.

Stage II of the Project was not taken in hand nor included in the Second Five Year Plan before the 1st November, 1956. Stage II which was taken in hand subsequently did not provide for irrigation in Mysore territory.

The Bombay Government was under no legal obligation to provide storage in the Koyna dam for the irrigation of Bijapur District. Nevertheless, the Bombay Government offered to reserve 25.53 T.M.C. of the storage for Mysore provided Mysore was willing to pay the cost, but the Mysore Government did not accept the offer.

The Mysore Government is not entitled to any relief under section 108(2) of the States Reorganisation Act.

The Mysore Government claimed relief under section 107 of the States Reorganisation Act also. However, Counsel for the Mysore Government does not press this claim.

Conclusion : Issue V(a)(ii) is answered in the negative.

(2) *Release of water from a storage dam at Ajra Issue V(a)(i)* :

The Bombay Government proposed the construction of a storage reservoir at Ajra on the Hiranyakeshi river and the Ghataprabha Right Bank Canal under the Ghataprabha Valley Development Scheme Stage III. Upon the reorganisation of States in 1956, Ajra remained within Bombay State and the area to be irrigated under Stage III of the scheme fell within the reorganised Mysore State.(15)

Mysore contended that in view of section 108(2) of the States Reorganisation Act, the scope of the proposed scheme could not be varied and Maharashtra, as the successor of Bombay State, was bound to supply water from a storage at Ajra for the benefit of the Mysore areas. Maharashtra denied the contention. The following issue was raised :—

Issue V(a)(i) : Should any directions be given for release of waters by Maharashtra for the benefit of Mysore from a storage dam at Ajra ?

We find that Ghataprabha Scheme Stage III including the storage dam at Ajra was not taken in hand nor included in the Second Five Year Plan before the 1st November, 1956. Section 108(2) of the States Reorganisation Act does not apply to the Project. Mysore is not entitled to any relief under section 108(2) as claimed.

On the 22nd January, 1971, Mr. Krishna Rao, Counsel for the State of Mysore, stated that he did not press Issue V(a)(i) and that Mysore would not ask for a mandatory order on Maharashtra for release of waters from any storage dam at Ajra.

Issue V(a)(i) is answered in the negative.

(3) *Extension of the Tungabhadra Left Bank Low Level Canal to Andhra Pradesh, Issue V(b)(ii)* :

Tungabhadra Left Bank Low Level Canal Scheme and dispute concerning its extension to Andhra Pradesh : The Tungabhadra Project Scheme finally formulated for execution as a joint scheme of Hyderabad and Madras Governments envisaged construction of the Left Bank Low Level Canal on the Hyderabad side 127 miles in length taking off from the Tungabhadra dam at Mallapuram and running in the district of Raichur. The scheme was taken up for execution by the Hyderabad Government in 1945.(16) Construction of the Left Bank Low Level Canal started in February 1945.

(15) MYPK IV pp. 8-9 MYDK II p. 381 ; MYK IV p. 34.

(16) Supplement to the Report of Tungabhadra Project Low Level Canal Scheme (1942), APPK XIX, p.1.

In 1947, the Hyderabad Government proposed an extension of the Left Bank Low Level Canal, so that the main canal would run up to mile 127 near Raichur from where it would bifurcate into North and South Gadwal branches and then join again and from the point of the junction, the Alampur distributary channel would take off. The length of the North Gadwal branch would be 41 miles, that of the South Gadwal branch 39 miles and that of the Alampur distributary 20 miles. At the same time, the Hyderabad Government proposed to restrict the irrigation to 4,50,000 acres up to a point a little beyond mile 127 near Raichur.(17)

Before the States Reorganisation Act, 1956, the entire Raichur District including Alampur and Gadwal Taluks formed part of the State of Hyderabad.

Under the States Reorganisation Act as from the 1st November 1956, Gadwal and Alampur Taluks were added to the States of Andhra Pradesh and the rest of the district became a part of the State of Mysore. The proposal to extend the Tungabhadra Left Bank Low Level Canal to Gadwal and Alampur Taluks was not implemented by the Mysore Government and the canal now runs up to mile 141 within Mysore State limits. Andhra Pradesh claims an extension beyond mile 141 so that it may irrigate 1,20,000 acres in Gadwal and Alampur Taluks with an annual utilisation of 19.2 T.M.C. Mysore denies the claim.(18)

Andhra Pradesh contends that the Left Bank Low Level Canal Project which was taken in hand, but not completed before the 1st November 1956, contemplated extension of the canal beyond mile 141 to Gadwal and Alampur Taluks and that, in view of section 108 of the States Reorganisation Act, the scope of the project cannot be varied. Consequently, Andhra Pradesh claims that the canal should be extended beyond mile 141 to Gadwal and Alampur Taluks. Mysore disputes the contention. The following issue was raised :—

> Issue V(b)(ii) : Should any directions be given for release of waters by Mysore for the benefit of Andhra Pradesh from Tungabhadra Left Bank Canal Project ?

Administrative sanction of 1951 : The estimate for the Tungabhadra project was sanctioned by the Hyderabad Government on the 16th January, 1951.(19) The report accompanying the estimate and the map annexed to it show that the Hyderabad Government undertook construction of the main canal up to mile 127 near Raichur and South Gadwal branch up to about mile 14 only and the North Gadwal branch was altogether deleted from the Project. The report stated :—

> "After the bifurcation into North and South Gadwal branches, the area is commanded jointly by the Tungabhadra Project and Upper Krishna Project. In the present estimate only 1/5th of the cost of these two branches is taken as debitable to the Tungabhadra project as done previously. From this amount the South Gadwal branch will be constructed upto about 14 miles and the North Gadwal branch will be altogether deleted. These branch canals are estimated on cusec mile basis as done before."

The administrative sanction of the Hyderabad Government shows that construction of the canal up to mile 141 only was taken up for execution. Extension of the canal beyond mile 141 to Gadwal and Alampur Taluks was not taken in hand by the Hyderabad Government.

On the 31st March, 1955, the Hyderabad Government sanctioned a cropping scheme for an ayacut of 5,80,000 acres in the Karnataka region up to mile 141. A proposal to extend the canal beyond mile 141 to the Telengana areas was under consideration, but the proposal was not finalised before the 1st November, 1956.(20) The Project taken in hand by the Hyderabad Government before the 1st November, 1956 was for construction of the canal up to mile 141 only.

Andhra Pradesh's claim for relief under section 108(2) of the States Reorganisation Act is not established :

Extension of the canal beyond mile 141 was not within the scope of the project which was taken in hand by the Hyderabad Government, but not completed before the 1st November 1956. It is conceded by Andhra Pradesh that the project was not accepted by the Government of India for inclusion in the Second Five Year Plan before 1st November, 1956. Accordingly, the provisions of section 108(2) of the States Reorganisation Act, 1956 are not attracted and Andhra Pradesh is not entitled to any relief under it.

(17) Tungabhadra Project Report (Hyderabad), pp. 7-8 (Ex. MYK 270).

(18) APK I pp. 43, 44, 136; MYK III pp. 31-32; Report of the Tungabhadra Project Left Bank Canal Extension to Gadwal and Alampur Taluks of Andhra Pradesh, APPK XXIX pp. 1-4.

(19) MYDK VIII pp. 9-34.

(20) APDK X pp. 128-134, 140-142; SP III pp. 94-102.

In his arguments before us, Counsel for Andhra Pradesh claimed relief under section 108(2) only. He did not argue that Andhra Pradesh was entitled to any relief under sections 107 and 108(1) of the Act or under any other provision of law.

The extension of the Tungabhadra Left Bank Canal and other projects in Mysore to areas in Andhra Pradesh can fructify only by close co-operation and mutual adjustments between the States concerned,(21) but instead of co-operative approach and mutual agreement, there is vigorous opposition to all such extension schemes by the State of Mysore.

Issue V(b)(ii) is answered in the negative.

(4) *Extension of a project on the Bhima in Mysore to Andhra Pradesh ; Issue V(b)(iii)* :

The Hyderabad Government contemplated construction of the Bhima Reservoir Project at Tangadgi in Gulbarga District for irrigating 4,00,000 acres in Gulbarga and Mahboobnagar Districts.(22)

Upon the reorganisation of States in 1956 most of Gulbarga District including Tangadgi fell within Mysore, and Mahboobnagar District became part of Andhra Pradesh.

After 1956, Mysore proposed the Bhima Lift Irrigation Scheme at Sonna and the Bhima Irrigation Project at Sonthi to irrigate Gulbarga District of Mysore.(23)

Andhra Pradesh now proposes the Bhima Project with headworks at Tangadgi in Mysore with extension to Mahboobnagar District of Andhra Pradesh to irrigate 3,80,000 acres with an annual utilisation of 100.7 T.M.C. of water.(24)

Andhra Pradesh contends that in view of section 108(2) of the States Reorganisation Act, 1956, the scope of the earlier projects cannot be varied and Mysore is bound to supply water from those projects for the benefit of Andhra Pradesh areas. Mysore denies the contention. The following issue was raised:—

Issue V(b)(iii) : Should any directions be given for release of waters by Mysore for the benefit of Andhra Pradesh from Bhima Project ?

We find that the Bhima Reservoir Project at Tangadgi was not sanctioned by the Hyderabad Government. Even the Bhima Irrigation Project and the Bhima Lift Irrigation scheme proposed by Mysore since 1956 have not yet been sanctioned by the Mysore Government. None of the Projects was taken in hand or included in the Second Five Year Plan before the 1st November 1956. Section 108(2) of the States Reorganisation Act, 1956 does not apply to the Projects. Andhra Pradesh is not entitled to any relief under section 108(2) for extension of irrigation facilities to Mahboobnagar District from any Project at Tangadgi in Mysore.

Issue V(b)(iii) is answered in the negative.

(5) *Extension of Upper Krishna Project to Andhra Pradesh, Issue V(b)(i)* :

The Hyderabad Government proposed construction of the Upper Krishna Project at Kamaladinne for irrigating Gadwal and Alampur Taluks and other areas in Hyderabad State. At the inter-State conference of 1951, the Hyderabad Government put forth a demand of 165 T.M.C. for the project. In view of the allocation of the Krishna waters in 1951, the Hyderabad Government earmarked 100 T.M.C. for the project. The project was included in the draft Hyderabad Second Five Year Plan.(25) Upon the reorganisation of States, Kamaladinne fell within Mysore while Gadwal and Alampur Taluks became part of Andhra Pradesh.

After 1956, the Mysore Government proposed the Upper Krishna project with headworks at Narayanpur for irrigating Gulbarga and Raichur Districts in Mysore. The project was sanctioned by the Planning Commission in 1963.(26)

The Andhra Pradesh Government now proposes extension of the Upper Krishna Project to irrigate 1,50,000 acres in Gadwal and Alampur Taluks with an annual utilisation of 54.40 T.M.C. of water.(27) Andhra Pradesh contends that, in view of section 108(2) of the States Reorganisation Act, 1956, the

(21) Report of the Krishna Godavari Commission, p. 220.
(22) APPK XIV pp. 1-3.
(23) MYPK VIII pp. 63, 76.
(24) APPK XXVIII pp. 3-5; APK I p. 44; SP III pp. 118-124; MYK III pp. 31-32.
(25) APPK XXVII, pp. 1-3.
(26) MYPK I, p. 20, MYDK XII, p. 1.
(27) APPK XXVII pp. 5-7; APK I, p. 44; MYK II pp. 31-32; SP III pp. 118-124

scope of the earlier Projects cannot be varied and Mysore is bound to supply water from those projects for the benefit of Andhra Pradesh areas. Mysore disputes the contention. The following issue was raised :—

Issue V(b)(i) : Should any directions be given for release of waters by Mysore for the benefit of Andhra Pradesh from Upper Krishna Project ?

We find that the Upper Krishna Project of Hyderabad was not sanctioned or taken up for execution by the Hyderabad Government. The Mysore Government started construction of its Upper Krishna Project after 1963. None of the Projects was taken in hand or included in the Second Five Year Plan before the 1st November, 1956. Section 108(2) of the States Reorganisation Act, 1956 does not apply to the Projects. Andhra Pradesh is not entitled to any relief under section 108(2) for extension of irrigation facilities to Gadwal and Alampur Taluks from the Upper Krishna Project.

Issue V(b)(i) is answered in the negative.

(6) *Munirabad Power House, Issue IV(B)(b)(iii), IV(B)(c), IV(B)(d)* :

Munirabad Power House and disputes relating thereto :

The Munirabad Power House has 3 generating sets of 9,000 kW each. It is situated on the left side of the Tungabhadra dam.

Construction of the Power House was started by the Hyderabad Government.(28) Before the 1st November, 1956, the Tungabhadra dam and reservoir on the left side including the Munirabad Power House were vested in the State of Hyderabad.

Under the States Reorganisation Act, 1956, with effect from the 1st November, 1956, Hyderabad District, Mahboobnagar District including the Taluks of Maktal and Narayanpeth, Alampur and Gadwal Taluks of Raichur District and Kodangal and Tandur Taluks of Gulbarga District of the erstwhile Hyderabad State were added to the State of Andhra Pradesh. The rest of Raichur and Gulbarga Districts including the site of Munirabad Power House became a part of the State of Mysore. In consequence of the reorganisation of States, the Munirabad Power House with all its assets and liabilities devolved on the State of Mysore(29) and the administration and control of the Power House vested in that State.

Andhra Pradesh claims a share of the power generated at the Munirabad Power House under sections 107 and 108(2) of the States Reorganisation Act, 1956, and, to ensure the supply of the power, an order for the vesting of the control of the Power House in the Tungabhadra Board. Mysore denies the claim and contends that the dispute is not a water dispute.

Accordingly, the following issue was raised :—

Issue IV(B)(b) (iii) : Should any direction be given for the vesting of the control and administration in the Tungabhadra Board of the Power House at Munirabad ?

Has the Tribunal any power to give such directions ?

(c) Is Andhra Pradesh entitled to a share in the power generated at the Power House at Munirabad ?

(d) Is the claim of Andhra Pradesh for a share in the benefits of the power generated at Munirabad Power House and/or for the vesting of the control and administration of the said Power House in the Tungabhadra Board a water dispute within the meaning of the Inter-State Water Disputes Act ?

Tungabhadra Hydro-electric Project Stages I and II

The Tungabhadra Hydro-electric Project of Hyderabad envisaged the construction of the Munirabad Power House in two stages. The project came under the purview of the First and Second Five Year Plans.

Work on Stage I of the project was in progress during April 1951 to March 1952.(30)

The revised estimate of Stage I of the Project was prepared in October 1954. Stage I of the project was sanctioned at the end of the First Five Year Plan and was included in the Plan before the 1st November, 1956.(31)

Stage I contemplated the installation of two generating sets of 9,000 kW each at the main station at Munirabad, the construction of 8 sub-stations including Narayanpeth sub-station, 132 kV transmission line from Munirabad to Raichur, 66 kV line from Raichur to Yadgir, 33 kV feeder line from Yadgir to Narayanpeth and other lines.

(28) SP III pp. 240-241.

(29) See Second Five Year Plan of Mysore State (1956-57 to 1960-1961) p. 175.

(30) Hyderabad Administrative Report, April 1951-March 1972, SP III pp. 240-241.

(31) SP III pp. 242-264, 267.

On the 24th August, 1957, the Planning Commission approved of Stage II of the Project for implementation in the Second Five Year Plan.(32) Stage II envisaged the installation of one additional generating set of 9,000 kW. The Project Report(33) stated:—

> "The maximum load demand by the end of 1961 is expected to reach 16085 kW, the details of which are given below :—

(1) Maximum demands as per Appendix I	6785	kW
(2) Maximum demands for Cemenet & Sugar Factories expected in the Raichur and Gulbarga Districts	3000	kW
(3) Maximum demands for lift irrigation	5000	kW
(4) Additional demands expected and agricultural processing due to increased irrigation facilities in the areas.	1000	kW
(5) Maximum demands under community project area	300	kW
	16,085	kW."

The Report gave the estimated load demand of 30 towns and villages. The demands of 5 Telengana towns were shown as follows :—

Name of locality	Power demand	
	Day KW	Night KW
1	2	3
District Gulbarga		
Tandur	300	100
Kodangal	60	20
Kosgi	100	30
District Mahboobnagar		
Narayanpeth	475	75
Maktal	40	10
	975	235

The Report also stated that (1) by 1963-64, at least 20 per cent increase in the loan might be expected and (2) as electrification of 20 more villages would be taken up, there would be additional load of nearly 1,700 kW.

Agreement of September 1956 for adoption of 110 kV transmission line.—

The original proposal for 132 kV transmission lines from Munirabad power station was meant for the southern districts of Hyderabad without any reference to the Mysore grid. In view of the proposed reorganisation of States, it became advisable to consider the station as part of an integrated grid consisting of Mysore system and Tungabhadra system. The Chief Electrical Engineer, Mysore, therefore, proposed to the Chief Engineer (Electrical), Hyderabad that 110 kV transmission line system should be adopted for the Tungabhadra Electrical Scheme in place of 132 kV line. On the 13th September, 1956, the Chief Engineer (Electrical), Hyderabad agreed to the proposal. (34)

On the 19th September, 1956, the Hyderabad Government sanctioned the acceptance of the joint recommendations of the two Chief Engineers. (35)

On the 3rd October, 1956, the Chief Engineer (Electrical), Hyderabad State, advised the Karnataka Chamber of Commerce, Hubli, that the power available from the Munirabad power station in the first stage could be made available for industries in the Munirabad/Raichur area and that further correspondence should be addressed to the Chief Electrical Engineer, Mysore. (36)

The change-over from 132 kV to 110 kV was done with a view to keep the Munirabad Power Station linked with the rest of the Mysore power system so that the power produced at Munirabad could be utilised fully in Mysore.

After this change, on the 24th August, 1957, the Planning Commission described Stage II of the Project as "the project relating to the second stage development of Tungabhadra Electric Project in the Karnatak region of the erstwhile Hyderabad State". (37)

(32) SP III 215.
(33) Report of the Tungabhadra Hydro-electric Project Stage II, SP III pp. 265-287 (Ex. APK 425).
(34) SP III pp. 302-306 Ex. MYK 292.
(35) SP III p. 285 Ex. APK 426.
(36) SP II p. 227 Ex. MYK 291.
(37) Letter of sanction of Stage II of the Project by the Planning Commission, SP III p. 215 (Ex. MYK 289).

Claim of Andhra Pradesh for 3376 kW of power under section 108(2) of the States Reorganisation Act.—

Andhra Pradesh contends(38) that the sanctioned Tungabhadra Hydro-Electric Project envisaged the supply of 3376 kW of power to Telengana towns and areas as mentioned below :—

(1) 5 towns	....1068 kW
Tandur	300 kW.
Kodangal	60 kW.
Kosgi	100 kW.
Narayanpeth	475 kW.
Maktal	40 kW.
	975kW

Assuming 1.15 per cent line losses and 1.05 diversity factor, the equivalent demand on power station was $\frac{975 \times 1.15}{1.05} = 1068$ kW.

(2) Sugar and cement factories for 3 Taluks of Raichur and Gulbarga districts transferred to Andhra Pradesh out of 25 taluks comprised in the two districts before the re-organisation of States. The demand for 3 Taluks was 3/25×3000=360 kW. . . .	360 kW.
(3) Lift irrigation and agricultural processing. The demand in the ratio of 6 taluks transferred to Andhra Pradesh and 22 taluks transferred to Mysore was 6/28×(5000+1000)=1285 kW. .	1285 kW.
Total	2713 kW.
(4) 20% increase in demand of 2713 kW. in Stage II.	543 kW.
(5) Estimated additional load in the towns of Maktal, Narayanpur, Nashirabad, Kodangal and Kosgi out of total additional load of 1, 700 kW. in Stage II	120 kW.
Grand Total	3376 kW.

Upon the reorganisation of States, Alampur and Gadwal Taluks of Raichur District, Kodangal and Tandur Taluks of Gulbarga District and Maktal and Narayanpeth Taluks of Mahboobnagar District of the erstwhile Hyderabad State, as also the five towns mentioned above, were transferred to the State of Andhra Pradesh.

Andhra Pradesh contends that the load forecast in the Project reports established a scheme of distribution of power to Telengana areas and towns, that in view of the States Reorganisation Act, 1956 neither the scope of the Project nor the distribution of its benefits can be varied, and that consequently it is entitled to the supply of 3,376 kW of power for the benefit of the towns and areas mentioned above.

Claim for relief under section 108(2) is not established.—

It is not shown that the Tungabhadra Hydro Electric Project established a scheme of distribution of power benefits. The load forecast in the project reports cannot be regarded as a scheme of distribution of benefits.

The object of the load forecast was to assess the probable future demand for the power generated at the Power Station. The load forecast did not bind the power station to supply power to any area. There was no certainty that the anticipated load demand would materialise or that they would arise in Telengana areas and towns.

Before the 1st November, 1956, the Hyderabad Government sanctioned the adoption of the transmission voltage of 110 kV. with a view to enable the Mysore Government to utilise the power in Mysore areas only. Accordingly the voltage of Munirabad Raichur line was fixed at 110 kV., the line between Yadgir to Raichur was retained at 66 kV. and no provision was made for Yadgir-Narayanpeth line or for Narayanpeth sub-station. On the 3rd October, 1956, the Chief Engineer (Electrical), Hyderabad, stated that the entire power from the power station in the first stage could be made available in the Munirabad Raichur region. Thus the Hyderabad Government clearly indicated that upon the reorganisation of States as from the 1st November, 1956, the Mysore Government would be at liberty to utilise the entire power produced by the Munirabad power station in Mysore areas.

Stage I of the project was taken in hand but not completed before the 1st November, 1956, but it is not shown that the scope of Stage I of the project or the distribution of the benefits to be derived from it has been varied after the 1st November, 1956

(38) SP III pp. 10-11, 13, 16-22.

Stage II of the project was taken in hand after the 1st November, 1956 and the provisions of section 108(2) are not attracted to it. Moreover, Stage II of the Project was for development of the Karnataka areas only.

Upon the reorganisation of States, the Munirabad power station with all its assets and liabilities devolved on Mysore. There is no basis for the claim that Andhra Pradesh is entitled to a share of the power generated at the power station without paying for it.

Andhra Pradesh is not entitled to any relief under section 108 (2).

Claim of Andhra Pradesh for 10,000 *kW. of power under section* 107 *of the States Reorganisation Act.*—

Andhra Pradesh contends that before the 1st November, 1956 there was an arrangement in regard to supply of 10,000 kW of power to Hyderabad city from Munirabad Power Station, that such arrangement has been modified by Mysore by reason of the fact that Hyderabad city was transferred by the States Reorganisation Act, 1956, from Hyderabad State in which the power station was located and that consequently suitable direction for the continuance of the arrangement should be given under section 107 of the States Reorganisation Act.(39)

The State of Hyderabad originally contemplated that 10,000 kW of surplus power would be supplied from Munirabad power station to Hyderabad city.(40)

However, in 1953, a Power Team consisting of Shri S. A. Gadkari and Shri S. K. Menon, Members Central Water and Power Commission, disapproved of the proposal and in their report to the Planning Commission observed that the surplus power of Munirabad Power House could be utilised in the south and south-western areas of the State and that Ramagundam Thermal Station could supply power to the Hyderabad area immediately.(41) Accordingly, the proposal for the supply of surplus power to Hyderabad city was abandoned and the reports of Stages I and II of the project did not envisaged the supply of power to Hyderabad city.

Claim for relief under section 107 *is not established.*—

The sanctioned Project Stages I and II did not envisage supply of power to Hyderabad city. It is not established that there was any arrangement before the 1st November, 1956, for the supply of 10,000 kW of power from Munirabad Power House to Hyderabad city. The argument that such an arrangement is established by the provision for 132 kV transmission line from Munirabad to Raichur in Stage I of the Project cannot be accepted. Had there been such a transmission line, it could be more easily connected with the 132 kV line to Hyderabad. But the provision for such a line does not indicate an arrangement for supply of power from Munirabad Power House to Hyderabad city. Even the provision for 132 kV line from Munirabad to Raichur was replaced by a provision for 110 kV line before the 1st November, 1956. The Hyderabad Government sanctioned the change with a view to facilitate the utilisation of the power produced at Munirabad in Karnataka areas.

Section 107 of the States Reorganisation Act is not attracted, and the claim based on it must fail.

Mysore Second Five Year Plan.—

The Second Five Year Plan of Mysore (1956-57 to 1960-61) stated(42) :—

> "Due to the annexing of the northern regions of Mysore, following the States Reorganisation, the Munirabad Power Station, viz., Tungabhadra Dam Left Bank Station is transferred to the State with an amount of Rs. 424 lakhs for the Station and the Transmission Lines and sub-stations connected with it. 18,000 kW will be available from this station during the plan period. All the power under this scheme will be distributed in the integrated region except 200 kW which will be supplied to Andhra Territory."

This statement does not advance Andhra Pradesh's claim for a share of power based on sections 107 and 108(2) of the States Reorganisation Act.

Andhra Pradesh does not claim any relief for the supply of 200 kW of power on the basis of the above statement.

(39) SP III pp. 23-32.

(40) Report of Hydro-electric Survey prepared in 1938, SP III p. 24; Plan of Power Scheme prepared in 1946, SP III pp. 42, 52; Note of Jaffer Ali prepared in 1949, SP III p. 43; Memorandum on electrical development in Hyderabad State dated 20-11-1951 submitted by Hyderabad Government to Planning Commision, SP III p. 24; Letter of Zafir Ahmed dated 1-7-1952 to the Planning Commission SP III pp. 47-48; Sketch accompanying tender notice issued by the Government of Hyderabad in 1952, SP III p. 49.

(41) Letter dated 17-2-1953 from Shri Gadkari and Shri Menon to the Secretary, P.W.D. Hyderabad; SP III pp. 217-222.

(42) SP II p. 301 Ex. APK 428.

The basis of the supply of 200 kW of power is not disclosed nor is it known for what period and on what terms the supply would be made.

Andhra Pradesh does not allege that there was any agreement for supply of 200 kW of power to it, nor does it seek or make out any case for relief on the basis of an agreement.

Answer to issues IV(B)(b) (iii), IV(B)(c) and IV (B)(d).—

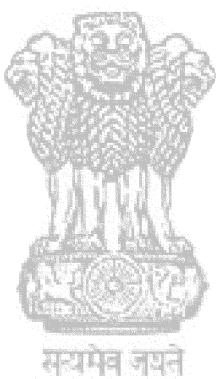
Andhra Pradesh is not entitled to any share in the power generated in the Power House at Munirabad. Issue IV(B)(C) is answered in the negative.

In view of this conclusion, there is no occasion for vesting the control and administration of the Power House in the Tungabhadra Board. Issue IV(B)(b) (iii) is answered in the negative.

Consequently, the question whether the dispute is a water dispute within the meaning of the Inter-State Water Disputes Act, 1956, does not arise. Issue IV(B) (d) is disposed off accordingly.

Gotur and Kocheri weirs and Karlahatti Bhandara.—

At one stage, Mr. Krishna Rao, learned Counsel for he State of Mysore, argued that we should impose restrictions on the State of Maharashtra with regard to Gotur and Kocheri weirs and Karlahatti Bhandara. On the 17th August, 1973, Mr. Krishna Rao stated that he did not press his contentions regarding Gotur and Kocheri weirs and Karlahatti Bhandara before this Tribunal. He added that, if necessary, resort would be made by the State of Mysore to the Government of India for giving appropriate relief regarding them.



CHAPTER VII

Diversion of the Godavari waters to the Krishna (Issue VI)

Pleadings.—In their statements of case both Maharashtra(1) and Mysore(2) prayed for a direction that the waters of the river Godavari be diverted to the Krishna. Maharashtra contended that this diversion would help to meet, partly or fully, the shortage of waters in the Krishna. Since this water shortage had been created by over-appropriations by Andhra Pradesh with evident assistance of the Centre, it was the responsibility of the Andhra Pradesh Government to take up this work of diversion at its own cost and meet its water requirement from its share of the Godavari waters which would come to Andhra Pradesh on equitable apportionment by the Tribunal. Mysore contended that if Andhra Pradesh should require waters in excess of its legitimate share to irrigate vast areas for raising a second or even a third crop, it was open to that State to divert waters from the Godavari, since the Godavari had plentiful waters for such diversion. The necessity for the diversion would appear from the report of the Krishna Godavari Commission and the statement of the Union Minister for Irrigation and Power in the Lok Sabha on the 23rd March, 1963.

Andhra Pradesh opposed the diversion and contended(3) that the dispute was not a "water dispute" within the purview of the Inter-State Water Disputes Act. Andhra Pradesh contended that it was for Andhra Pradesh to consider whether it should augment its supplies in the Krishna by diversion of its share of the Godavari waters if its share of the Krishna waters fell short of its commitments and that this matter did not concern the other two States.

Issue.—The following issue (Issue VI) was raised.—

> "Is it possible to divert waters from the river Godavari to the river Krishna ? Should such diversion be made and, if so, when, by whom, in what manner and at whose cost ? Is the Tribunal competent to adjudicate on these questions ?"

Order of the Tribunal.—On April 19, 1971, the Tribunal passed an Order in terms of the following agreed minutes filed by Counsel for the States of Andhra Pradesh, Maharashtra, Mysore, Madhya Pradesh and Orissa :—

> "(1) Parties have agreed that each of the States concerned will be at liberty to divert any part of the share of the Godavari waters allocated to it by the Godavari Tribunal from the Godavari basin to any other basin.
>
> (2) In view of the pleadings and the statements of the States concerned, none of the States asks for a mandatory order for diversion of the Godavari waters into the Krishna basin.
>
> (3) All the other contentions of the parties are reserved and will be decided in the Krishna case.
>
> (4) The Krishna case will be decided separately from the Godavari case.
>
> (5) The States of Madhya Pradesh and Orissa are ordered to be discharged from the record of this case and will no longer be parties to this case.
>
> (6) The States of Madhya Pradesh and Orissa will bear and pay their own costs."

Clause 1 of the above order was amended by an order passed in terms of agreed minutes filed by the parties on the 27th July, 1971. The amended clause 1 is as follows :—

> "Parties have agreed that each of the States concerned will be at liberty to divert any part of the share of the Godavari waters which may be allocated to it by the Godavari Tribunal from the Godavari basin to any other basin."

(1) MRK I pp. 204,213-222, 225.
(2) MYK I pp. 55-57, 65.
(3) APK VII pp. 8-9.

Similar orders were passed in the Godavari case.

Effect of Orders of the Tribunal.—In view of the above orders, the State of Andhra Pradesh is free to divert its share of the Godavari waters to the Krishna river, but it can not be compelled to do so.

It is still necessary to consider whether the possibility of the diversion of the Godavari waters to the Krishna or the absence of such diversion affects the equitable share of the parties in the Krishna waters.

Topo-sheet study.—The upper reaches of the Godavari Valley are lower than the corresponding reaches of the Krishna Valley. It is, therefore, not possible to divert, by flow, any waters from the upper reaches of the Godavari into the upper reaches of the Krishna.

The highest suitable point on the Godavari is near Pochampad from where its waters can be dropped into the Nagarjunasagar reservoir on the Krishna. In the lower reaches, there are possibilities of diverting the Godavari waters by a link canal from the Godavari near Albaka to Pulichintala on the Krishna and a link canal from the Godavari at Polavaram to Vijayawada.

Earlier Proposal.—The Ramapadasagar Project of 1951 contemplated diversion of the Godavari waters by the Polavaram-Vijayawada link canal.(4) The Khosla Committee(5) discussed the possibility of the diversion.

Krishna Godavari Commission.—In 1961, the Krishna Godavari Commission was asked to report on the feasilibity of diverting any surplus supplies in the Godavari to the Krishna indicating the quantity to be diverted and the cost involved. After examining this question, the Commission recommended that the shortage in the Krishna basin could be made up partly by the transfer of such surplus supplies from the lower Godavari area as could be utilised in the Krishna basin by the following two link canals :—

(a) A link canal from the Godavari at Polavaram to Vijayawada at a cost of about Rs. 40 crores. This link canal would transfer about 211 T. M. Cft. of water to the Krishna.

(b) A link canal from the Godavari near Albaka or Singaraddy to Pulichintala on the Krishna at a cost of about Rs. 40 crores. This link canal would transfer about 95 T. M. Cft. of water to the Krishna.

The Commission considered that it should be possible, on the basis of the information contained in their report as well as field reconnaissance and some preliminary surveys to be carried out, to prepare a preliminary project report in about 6 months and establish the feasibility or otherwise and the scope of the proposed diversions from the Godavari to the Krishna.(6)

Later investigations.—As a result of the recommendations of the Krishna Godavari Commission, the work of investigating the diversion of the Godavari waters to the Krishna was entrusted to the Central Water and Power Commission and two Circles were opened, one for investigating the diversion links and the other for measuring discharges at some key stations on the Krishna and Godavari rivers. The Government of India set up the Godavari Krishna Technical Committee to review the progress of work in the two Circles and give suitable guidance to them. The feasibility of the link canals was discussed in four meetings of the Godavari Krishna Technical Committee between 1963 and 1966 and in inter-State meetings held in August and October 1967. No agreement on the subject was reached between the concerned States.

Godavari-Pulichintala link canal.—The Krishna Godavari Commission considered that it might be possible to divert 95 T. M. C. of the Godavari waters annually from this link canal. However, it is no longer contended by Maharashtra and Mysore that this link canal is technically feasible. Accordingly, we are not called upon to consider the possibility of diversion by this link canal.

Polavaram-Vijayawada link canal.—This link canal formed part of the Ramapadasagar Project which was later abandoned. The Polavaram Barrage scheme proposed by Andhra Pradesh consists of a barrage at Polavaram on the Godavari and two canals. The right bank canal of this scheme would run up to Vijayawada. At the first meeting of the Godavari Krishna Technical Committee, all members agreed that Polavaram would be the best site for the link canal and that since the Polavaram barrage as well as

(4) Ramapadasagar Project Report 1951 Vol. I, pp. 14, 17, 20, Vol II, Index Map.
(5) Report of the Technical Committee for optimum utilization of the Krishna and Godavari Waters 1953, pp. 73-76, 101-103.
(6) Krishna Godavari Commission Report, pp. 2, 290-294, 320-321.

the Vijayawada barrage would have no storage of their own, it would be necessary to have a storage site on the Godavari river upstream of Polavaram to provide the necessary storage for meeting the requirements of both the Godavari and Krishna Delta canals.(7) At the second meeting of the Committee(8) it was decided that the base study for the link canal would be made on the basis that the link canal would take off by a diversion structure from near about Polavaram and would get regulated supplies from a storage higher up or releases from a number of projects high up. At the second, third and fourth meetings of the Committee (9), and at inter-State meetings held in August and October 1967 several storage sites on the Godavari were discussed, but no agreement was reached. Maharashtra has stated that storages at Inchampalli and Ippur at the requisite level are not permissible in view of the extensive submergence of areas in Maharashtra and Madhya Pradesh and that except the Bhopalpatnam and Watra Badruk Project no other storage for meeting the reasonable irrigation needs of Andhra Pradesh is feasible.(10) This statement is not disputed by Mysore.

Revised Maharashtra Scheme.—In its final statement(11) regarding the Godavari diversion, Maharashtra proposes that for meeting the needs of the Krishna Delta, 146 T. M. C. of the Godavari waters may be diverted by the Polavaram-Vijayawada link canal from the run of the river supplies and regulated releases of 171 T. M. C. from the Bhopalpatnam storage and 182 T. M. C. from the Watra Badruk storage. The Bhopalpatnam storage on the Indravati river would be a joint project of Madhya Pradesh and Maharashtra and the Watra Badruk storage on the Pranhita river would be a joint project of Andhra Pradesh and Maharashtra. One of the two storages is necessary and sufficient for the diversion scheme. Sufficient surplus supply from Andhra Pradesh's share in the Godavari waters after meeting its reasonable requirements will be available for diversion to the Krishna. The right bank canal of the Polavaram barrage scheme with suitable modifications can serve as the Polavaram-Vijayawada link canal. Mysore generally supports this proposal(12). Andhra Pradesh opposes the proposal(13).

Proposal for Bhopalpatnam and Watra Badruk projects.—Before the Godavari Water Disputes Tribunal, Madhya Pradesh proposed Bhopalpatnam Project Stages I and II as a joint project of Madhya Pradesh and Maharashtra(14). The note on the Project stated that the proposal was based on topo-sheets and that field investigations were being undertaken. Maharashtra supported the proposal.(15) The Project would submerge large areas in the territories of both Madhya Pradesh and Maharashtra.

Before the Godavari Water Disputes Tribunal, Andhra Pradesh proposed the Watra Badruk (Pranhita) Project and stated that it would be for the mutual benefit of Maharashtra and Andhra States if the project was taken up as a joint venture.(16) Andhra Pradesh stated that detailed investigation of the scheme was in progress. The project would submerge large areas in the territories of both Andhra Pradesh and Maharashtra. Maharashtra supported the proposal.(17)

There is no material before the Tribunal to show that the field investigations have been completed. No joint project report of either the Bhopalpatnam Project or the Watra Badruk Project has been filed before the Tribunal. After the project reports are prepared, joint cost-benefit schemes will have to be finalised and it will be then for the States to consider whether any of the joint projects is feasible or advantageous. It is not possible at this stage to say that Maharashtra and Madhya Pradesh will enter into an agreement for the undertaking of the joint Bhopalpatnam Project or that Andhra Pradesh and Maharashtra will enter into an agreement for the undertaking of the joint Watra Badruk Project. In the absence of an agreement, there cannot be a joint project or storage either at Bhopalpatnam or Watra Badruk. One of the two storages is necessary and essential for the diversion scheme proposed by Maharashtra. On the present materials it is not possible to say with certainty that either of the two storages will be available in the near future.

(7) MRK I p. 217; MRDK II pp. 79-83.

(8) MRDK II p. 85.

(9) MRDK II pp. 83-113.

(10) SP II, p. 10.

(11) SP II, pp. 3-39.

(12) SP II, pp. 40-47

(13) SP II, pp. 48-63

(14) Notes on Bhopalpatnam Project I and II, MPPG XI. Similar proposal was made before the Krishna Godavari Commission, see KGCR Ann. XV p. 241.

(15) MRPG XXXVIII p. 193, MRG II pp. 78-81; MRK I p. 220.

(16) Note on Pranhita Project APPG XI pp. 23-24. Separate projects on the Pranhita river near Watra Badruk were proposed by Andhra Pradesh and Maharashtra before the Krishna Godavari Commission, see KGCR Ann. XV pp. 139-141 , 505-507.

(17) MRG II, pp. 82-85; MRK I, p. 220.

Possibility of Godavari diversion and equitable apportionment of the Krishna waters.—It may be that sooner or later either the Bhopalpatnam Project or the Watra Badruk Project may materialise and in that event the scheme for diversion of the Godavari waters to the Krishna river for meeting a part of the requirements of the Krishna Delta Canals can be carried out. But the remote possibility of diversion of the Godavari waters to the Krishna is not a sufficient ground now for cutting down the allocation of an equitable share of the Krishna waters to Andhra Pradesh for meeting its needs.

Maharashtra argument regarding equities.—Maharashtra argues that in view of the statement of the Union Minister for Irrigation and Power in the Lok Sabha on the 23rd March, 1963 and other statements of the Union Government regarding diversion of the Godavari waters into the Krishna, equities have arisen in favour of Maharashtra and Mysore and that if the diversion of the Godavari waters to the Krishna does not materialise, the allocations for Nagarjunasagar and Srisailam Project of Andhra Pradesh should be suitably cut down and modified. We are unable to accept this contention for the following reasons :—

In his Lok Sabha speech on the 23rd March, 63,([18]) the Union Minister for Irrigation & Power said that Nagarjunasagar Stage II could be cleared only after investigations on Godavari supplies would be completed. He did not say that in the absence of the Godavari diversion the sanctioned Nagarjunasagar Project (Stage I) would be modified. Nagarjunasagar Project was undertaken in 1955 and its sanction was not dependent on the availability of supplies from the Godavari.

The Union Minister stated that Srisailam Project should be suitably modified after taking into account the requirement of 264 T. M. C. for Nagarjunasagar Project, the possibility of diversion of the Godavari waters and inflows between Srisailam and Nagarjunasagar. Suitable action was taken on this statement. On March 26, 1964, Srisailam Project was sanctioned by the Planning Commission.([19]) The sanction was on the basis of ultimate water release of 180 T. M. C. from Srisailam. The preliminary sanction letter of June 7, 1963 and the letter and note of Planning Commission dated July 5, 1963 ([20]) pointed out that even on the assumption that the Godavari diversion would materialise, it could be safely assumed that the minimum release for power generation from Srisailam would be 180 T. M. C. annually. If there is no diversion of the Godavari waters into the Krishna, it will be necessary to release more than 180 T. M. C. annually from Srisailam to meet the requirements of Nagarjunasagar Project and Krishna Delta Canals. The sanctioned Srisailam Project is not dependent or conditioned on the availability of additional supplies in the Krishna from the Godavari diversion.

On March 23, 1963, the Union Minister also stated that pending final allocation of waters, Maharashtra, Mysore and Andhra Pradesh should withdraw respectively 400 T. M. C., 600 T. M. C. and 800 T. M. C. of supplies from the Krishna. At a meeting between the representatives of Maharashtra and Union Governments on April 22, 1963([21]). Shri S. B. Chavan, Minister of Irrigation & Power, Government of Maharashtra said that it was not clear on what basis the withdrawals had been allowed. Shri Hafiz Mohammad Ibrahim, Union Minister for Irrigation and Power stated that the withdrawals indicated by him were only estimates and were not in any way final allocations. Shri M. R. Sachdev, Secretary to the Government of India, Ministry of Irrigation and Power stated that sizeable surplus would be available for further allocation to Maharashtra and Mysore as a result of diversion of the surplus waters of the Godavari to the Krishna but the quantum would be known after the investigations would be completed. Shri C. L. Handa, Member, Central Water and Power Commission stated that additional supplies would be available as a result of diversion of the surplus waters of the Godavari estimated at 300 T. M. C. by the Gulhati Commission, and from regeneration or salvage of irrigation flows ; but he could not say how much of the additional supply would be available to Maharashtra. Shri O. V. Alagesan, Minister of State, Irrigation & Power said that 300 T. M. C. as a result of the Godavari diversion and 300 T. M. C. as a result of regeneration or salvage *i.e.* in all 600 T.M.C. would be available and the allocation had been made on that basis. Shri Handa stated that the surpluses on account of regeneration and salvage could not be quantified. Shri B. Y. Barve, Minister of Finance, Government of Maharashtra stated that, according to Maharashtra, hardly any further supplies in addition to the withdrawals of 400, 600 and 800 T. M. C. indicated in the Union Minister's statement would be available for allocation from the Krishna. No definite assurance was given to Maharashtra by the Union Government that investigations regarding the Godavari diversion had

(18) MYDK I pp. 156-171.
(19) MRK II, p. 310.
(20) APDK VIII, pp. 1-5; MYDK II, p. 320.
(21) MRK II, pp. 205-218.

been completed and such diversion was technically feasible, or that any portion of the additional supplies in the Krishna from the diversion would be available to Maharashtra, nor did Maharashtra act upon such an assurance. No representative of Andhra Pradesh was present at the meeting. Our attention was not drawn to any other statement of the Union Government in this connection. Andhra Pradesh made no representations concerning Godavari diversion for which it can be saddled with any equities in favour of Maharashtra and Mysore.

The States of Maharashtra and Mysore submitted that in the event of diversion of the waters of the river Godavari to the river Krishna, there should be a self-executing order providing for equitable distribution of such waters. Alternatively, they submitted that in the event of augmentation of the waters of the river Krishna by the diversion of the waters of the Godavari, the Ganga or any other river, liberty should be reserved to them to claim the benefits of the diverted waters. The State of Andhra Pradesh strongly disputed these claims. The question whether the States of Maharashtra and Mysore should be given any share in the diverted waters will require examination if and when the waters of the river Godavari or any other river are diverted into the river Krishna. We are providing for review of our final order after the 31st May, 2000. We are inclined to think that all the States should be at liberty to urge their respective contentions before the reviewing authority after the 31st May, 2000 and not earlier. Accordingly, we propose to pass the following order :—

> "In the event of the augmentation of the waters of the river Krishna by the diversion of the waters of any other river, no State shall be debarred from claiming before the aforesaid reviewing authority or tribunal that it is entitled to greater share in the waters of the river Krishna on account of such augmentation nor shall any State be debarred from disputing such claim".

Issue VI is answered accordingly.

CHAPTER VIII

Ground Water

Ground Water.—The fresh water resources of a basin include both surface and ground water. Both surface and ground water are replenished by rainfall and form part of the circulatory pattern of the hydrologic cycle. If the water table at the top of the zone of saturation is above in level of the water surface in a stream, ground water seeps into the stream; but when the water table is below this level, there is seepage from the stream into the porous layers of rocks. Thus, ground water supplies the relatively stable and uniform base flow of the stream and is, in its turn, replenished by the stream flow. Depletion of ground water by pumping or otherwise may reduce the stream flow somewhere else in the river basin(1).

For equitable apportionment of waters of an inter-State river system, the underground water resources of a State is a relevant factor. Ground water may furnish alternative means for satisfying the State's irrigation needs. Moreover there may be such a close connection between the surface and ground water resources of a river basin that it may be necessary to limit the use of ground water to prevent diminution of the water supply downstream(2).

Under the Indian law, every owner of land has the right to collect and dispose off within his own limits all water under the land which does not pass in a defined channel(3). The Indian law is based on the common law of England. The common law doctrine(4) has been considerably modified in England by the Water Resources Act 1963, Chapter 38, sections 23 to 32, but the general Indian law continues to be the same as before.

However, ground water flow is not fully calculable from the technical point of view and, therefore, not fully cognisable as yet from the legal point of view(5). Being invisible, ground water resources baffle quantitative measurement(6).

In the Krishna basin, systematic ground water surveys have not been carried out, and sufficient data of ground water resources are not available(7). In view of this lack of data, the Tribunal passed an order on the 1st April, 1971, in terms of the following agreed minutes (Annexure 'A' to the order) filed by the States of Andhra Pradesh, Maharashtra and Mysore.

"Having regard to the fact that there is no available data relating to underground water which the parties can place before this Honourable Tribunal for the purpose of deciding the present dispute, the parties state, for the purpose of this dispute, as follows:—

1. The underground water resources of the States concerned will not be regarded as alternative means of satisfying their needs and will not be taken into account for purposes of the equitable apportionment of the waters of the river Krishna and the physical basin (river-valley) thereof.

2. The States do not ask the Tribunal to put any restrictions on the use of underground water by the States."

(1) The Year Book of Agriculture 1955, Water, (The U.S. Dept. of Agriculture) pp. 48, 49, 73; O.E. Meinzer, Hydrology pp. 399; 432; E. Kuiper, Water Resources Development, Planning, Engineering and Economics (1965) p. 8; Ground Water Studies—Edited by R.H. Brown and others, UNESCO 1972, para 1.1.2.

(2) Arizona v. California 376 U.S. 340. (Clause IV of the decree); Masters Report in the same case cited in A.H. Garretson and others, The Law of International Drainage Basins 1967 pp. 525-526, see also ibid pp. 585-586.

(3) The Indian Easements Act, 1882, Illustration (g) Report of the Indus (Rau) Commission Vol. I, pp. 54-55.

(4) See Chasemore v. Richards (1859) L.R. 7 H.L.C. 349.

(5) A.H. Garretson and others, The Law of International Drainage Basins (1967) p. 312; L.A. Teclaff, The River Basin in History and Law, p. 10.

(6) The Nation's Water Resources, United States Water Resources Council 1968, pp. 3-2-1, 3-2-7.

(7) Report of the Krishna Godavari Commission, p. 145; Report of the Irrigation Commission 1972 Vol. III Part II, p. 194.

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On the 25th September, 1972, the parties filed the following agreed statement:—

"With reference to Annexure 'A' to the order of the 1st April, 1971, the States of Andhra Pradesh, Maharashtra and Mysore are agreed that for clause 2 of the said Annexure 'A' the following clauses 2 and 3 be substituted :—

2. The States will be free to make use of underground water within their respective State territories.

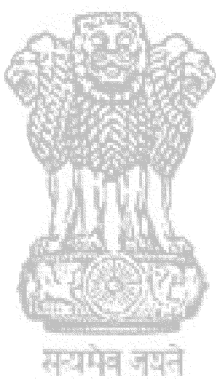
3. This agreement will not be taken in any way to alter the rights, if any, under the law for the time being in force, of private individuals, bodies or authorities."

On a consideration of all relevant materials, we propose to pass the following order: —

"The Tribunal hereby declares that the States of Maharashtra, Karanataka and Andhra Pradesh will be free to make use of underground water within their respective State territories in the Krishna river basin.

This declaration shall not be taken to alter in any way the rights, if any, under the law for the time being in force of private individuals, bodies or authorities.

Use of underground water by any State shall not be reckoned as use of the water of the river Krishna."



CHAPTER IX

Determination of Dependable Flow

This chapter would cover discussions on the first sub-issue of Issue No. II. The main Issue II is to this effect :—

> "What directions, if any, should be given for the equitable apportionment of the beneficial use of the waters of the Krishna river and the river valley?"

The sub-issue (1) under discussion in this chapter is:—

> "On what basis should the available waters be determined?"

This sub-issue broadly speaking is concerned with the determination of the quantum of water which is available for allocation between the different States. As observed in the Krishna Godavari Commission Report in Chapter XI relating to 'Hydrologic Characterstics', the source of all water in the Krishna and the Godavari basins, whether in stream flow or under the surface, is the rain which falls within the area. There is no evidence of any sub-soil flow from outside getting into the basin. So far as underground water is concerned, all the three States would be free to use the underground water within their respective State areas as they wish.

The subject relating to the availability of the surface water has engaged much attention and time of this Tribunal and has been the subject matter of acute controversy between the parties. The oral evidence regarding dependable flow commenced on the 6th September, 1971 with the testimony of Mr. Framji (MRW-1), the expert witness of the State of Maharashtra. The principal witness Prof. Rao (APW-5), who appeared on behalf of the State of Andhra Pradesh was also examined at great length and his evidence concluded on the 30th March, 1972. The arguments on the sub-issue started on the 3rd July 1972 with a lengthy address by the learned Advocate General of the State of Andhra Pradesh. He was followed by the Advocate General of Maharashtra, whose argument in the main has been adopted by Mr. Krishna Rao, appearing on behalf of the State of Mysore. It is a tribute to the learning and ability of the learned counsel and the engineers of the three States as also to their mutual appreciation of the points of each other which have prompted them to conclude a settlement on this controversial point and therefore it is now necessary only to refer to the barest facets of this crucial question.

It is generally agreed that the volume of water which passes over and through the Vijayawada Weir would give us a fair idea of the volume of flow in the river after the upstream utilisations are added to it. From Vijayawada Weir onwards the river Krishna forms into a delta and flows eventually into the sea.

In the notes submitted by the Central Water and Power Commission on the utilisation of supplies in the Krishna river for consideration of the Conference held on the 27-28th July, 1951 which is mentioned in the discussion of Issue I, it was observed thus (MRDK Vol. I, page 117) :—

> "Discharge observations of the river Krishna are available for Bezwada (Vijayawada) site in Madras for the year 1895 to 1945 i.e. for 51 years. Actual yearly run off are given in Statement 'A'. The mean annual run off comes to 1957 T.M. Cft. This, however, is available in 21 years only out of 54 and hence cannot be taken as dependable supply. Runoff of 1800, 1700 and 1450 are available in 30 years, 37 years and 44 years respectively. Hence dependable supplies at Bezwada excluding present utilisation above may be taken as 1450 T.M.Cft. This tallies with the figure worked out by Hyderabad. The Madras figure of 2000 is too high".

It was on this basis that the allocation was made between the different States in the Conference of 1951. For reasons which have already been stated, we are unable to attach any importance to the agreement reached on the 28th July, 1951.

Broadly speaking, the position of Maharashtra and Mysore is that for the purpose of irrigation the volume of available water of the river Krishna should be computed at 75 per cent dependability. It would be a safe basis as the flow at 75 per cent dependability would be available in 3 out of 4 years. The contention of the State of Andhra Pradesh is that the figure of 1745 recorded in 1951 should be stuck to and that 86 per cent dependability is a reliable criterion.

Dependable flow is the magnitude of river flow which may be assuredly expected at a given point on the river on some scientific or rational basis inspiring confidence. We may mention here a simple statistical method for determining the percentage dependability of the flow of a river at a particular point. For ascertaining the percentage dependability of the flow at a given point of a stream where a continuous record of flow for a number of N years is available, the flow discharge data is arrayed in descending order. Each year's flow so arrayed is assigned the serial number from the top and if M be the serial number of the flow in any year, the percentage dependability for the flow of that year is calculated by applying the formula $\frac{M}{N} \times 100$. Some authorities say that the percentage dependability should be arrived at by applying the formula $\frac{M}{N+1} \times 100$ but all the parties in this case have adopted the formula $\frac{M}{N} \times 100$.

If flow at a particular dependability is to be computed and is not directly available from the flow series as mentioned hereinbefore then the flow data for the two consecutive years—one just above the required dependability and the other just below the required dependability is taken into consideration and proportionate adjustment is made to arrive at the flow at that particular dependability.

For example, take a series of flow discharge data of the river Krishna at Vijayawada for 78 years. If, in this series, the flow of a certain year having the serial number 58 is 2063 T.M.C., the percentage dependability of the flow of 2063 T.M.C. is $\frac{58}{78} 100 =$ 74.36 per cent and if the flow of the next year having the serial number 59 is 2057 T.M.C., the percentage dependability of the flow of 2057 T.M.C. is $\frac{59}{78} \times 100 = 75.64$ per cent. Therefore, in this flow series of 78 years the flow of $\frac{2063+2057}{2}$ or 2060 T.M.C. has the percentage dependability of $\frac{74.36+75.64}{2} = 75$ per cent. In other words, the flow of 2060 T.M.C. is expected to appear in the river at Vijayawada in 75 out of 100 years and is called the 75 per cent dependable flow of the river Krishna at Vijayawada.

The Committee on Plan Projects of 1960 set up by the National Development Council examined both the Koyna (Maharashtra) and Nagarjunasagar (Andhra Pradesh) projects in some detail and at page 5, paragraph 2.23 of AP-27, made the following observations :—

> "It is, therefore, for consideration whether the scope of projects for assured irrigation should be extended beyond the dependable yield adopted in the 1951 award. This question has been discussed with Central Water and Power Commission and it has been suggested by them that many of the current projects under sanction are planned on seventy-five per cent to eighty per cent dependability and this should be adopted for the Krishna basin. The Project Authorities have expressed similar views during discussions. This question has also been discussed with the Consultative Committee and they have expressed that for the assured irrigation projects on Krishna river, a dependability of 75 per cent may be adopted, and that the same percentage be adopted in respect of projects of all States on the Krishna river."

In the statement regarding the Krishna and the Godavari waters laid by the Union Minister for Irrigation and Power on the Table of the Lok Sabha on the 23rd March, 1963 reproduced at page 156 of MYDK Vol. I, it was stated as follows at page 164:—

> "In the matter of availability of supplies, from overall considerations, a criterion based on 75 per cent dependability has been considered to be the most suitable and for the purposes of our projects that have to go forward, this criterion of dependability may be adopted".

We shall deal with this subject further in connection with our decision on the question of apportionment of water of the river Krishna between the three States.

It would be recalled that in the minutes of the proceedings of the Conference of July, 1951, it was

stated by Shri Venkatacharya, Chief Engineer of Madras that the discharge figures of the Krishna river which had been worked out in the note were underestimated by about 8 per cent. This observation was merely "noted" and the allocations were made at 86 per cent dependability.

The first term of reference of the Krishna Godavari Commission appointed by the Government of India on the 1st May, 1961 was —

"(1) To report on the availability of supplies in the Krishna on the basis of annual flow at Vijayawada and other points taking into account upstream utilisation and allowing for regeneration :—

(i) for 86 per cent dependability as assumed in 1951 ;

(ii) for 75 per cent dependability ; and

(iii) for such other criterion of dependability as may be considered appropriate".

The Commission, while submitting its report on the 21st August, 1962, did not record any definite answer to the question covered by the first term of reference and it was stated that because of the uneven distribution of discharge sites there are many sub-basins in which no river flow data exists. The Commission strongly recommended as a matter of first urgency, vide paragraph 18—34 of its Report, the establishment on a permanent basis and on scientific lines of daily discharge observations at 33 sites on the Krishna River System. The Commission observed that this data is essential for the individual projects, for the preparation of an integrated basin-wide plan, for the subsequent operation of such a plan and the regulation to the best advantage of the available river waters in any year. The Central Government was charged with the responsibility of this important work and also to set up a special organisation for this purpose under the Ministry of Irrigation and Power. Further, it was stated in paragraph 18—37 of this Report :—

"It is unfortunate that no attempt has so far been made to undertake regular discharge observations at the sites of proposed projects. Even for the projects under construction, little attention has been paid to the observation and compilation of accurate flow data."

It will be relevant at this stage to mention some of the predominant factors which influence the runoff. This factors have been enumerated in the artical 'Flood Hydrographs' by Gail A. Hathaway and A. L. Cochran in the book "Engineering for Dams" by the Late William P. Greager and others at pages 140 and 141 Vol. I (Fourth Printing, March, 1950).

They are as follows :—

"Rainfall.

a. Intensity, duration, sequence.

b. Areal distribution during successive time intervals.

Infiltration.

a. Initial loss, or loss before appreciable runoff begins.

b. Minimum average capacity, or in some cases, the relation of capacity to field-moisture conditions.

Regimen of Runoff.

a. Effects of basin configuration and arrangement of tributaries.

b. Effects of natural storage:

1. In tributaries, lakes, swamps, etc.

2. In principal stream channels and valleys.

c. Effects of artificial structures :

1. Reservoirs.

2. Channel improvements.

3. Land-use practices.

d. Effects of slopes :

1. In principal stream channels and flood plains.

2. In drainage areas tributary to principal runoff channels.

e. Effects of land coverage :

1. Forested areas.

2. Cultivated areas.

3. Pasture lands and barren areas.

f. Ability of subsurface soil to transmit infiltrated water to surface channels within the period required for direct runoff to pass through the channel storage phase of runoff."

Each of these factors has its own effect on the runoff. The cumulative effect of all these factors has to be taken into consideraton in determining the total quantity of water available for utilisation in any region. There are obvious difficulties in computing runoff of

a mighty river like the Krishna which has its origin in high mountainous region covered with forests having heavy intensity of rainfall and which in its course towards the sea descends at various degrees of slopes and crosses through forested areas, cultivated areas, pasture lands and barren areas gathering water on its way from innumerable nullahs, streams and tributaries some of which are as mighty as the river Krishna itself. Measuring water accurately in the Krishna basin by establishing rainfall runoff relationship is a difficult problem.

But the other method of determining water available in a basin is to measure water flowing in a stream. Stream flow though dependent on so many factors of diverse character and varying degree of intensity, represents the residual water available in a drainage basin. Stream flow represents the integrated results of all meteorological and hydrological factors operative in the drainage basin and it is the only phase of the hydrologic cycle for which reasonably accurate measurements can be made of the volumes involved(1).

This method of measuring the water available in the Krishna basin has been followed since a long time.

At Vijayawada the construction of an anicut across the river Krishna was sanctioned by the Court of Directors of the East India Company. It was built in 1852—55. The primary purpose of the construction of the weir was for irrigating parts of Guntoor and Masaulipattam Districts. The Anicut was also utilised for measuring the water of the river flowing over it by applying the formula known as M.D.S.S. formula. The importance of the measurement of discharge at Vijaywada is that after the river had passed the Vijayawada Anicut, it receives practically no contribution of water from surface runoff due to rainfall. Thus, after taking into account the utilisations, discharge over the Anicut reflects the amount of water available due to run off in the entire Krishna basin. The plan and section of the Anicut are found in G.T. Walch's 'The Engineering Works of the Kistna Delta', Vol. II (APK-582). The changes brought in the Anicut after its construction are described by Walch in the note in the Plan as follows :—

> "The crest of the Anicut was raised above what is here shown by 1 foot in 1891-92 and by another 2 feet in 1894. This 2 feet was removed in 1897 and for it falling shutters substituted in 1898. The solid portion of the crest in front of the shutters is now 1' 3" higher than the crest as shown on this plan; it is taken as +47.50 and the top of the shutters when up +50.25."

The dimensions of the Anicut which were taken in consideration for calculating discharges are shown in Fig. 1 in the Kistna Reservoir Project Vol. II Ex-APK-403 at page 1 and the cross-section of Vijayawada Anicut is shown as Fig. III at the same page. In the description of the Anicut as given at pages 1 and 2 of these Kistna Reservoir Project—Vol. II reference is made to the falling shutters fixed on the Anicut :—

> "The length (3,076.75 ft.) of the horizontal crest of the work is fitted with falling shutters which are 10 ft. long each and when raised have an effective height of 2.75 ft.
>
> When down, these shutters lie prone behind the masonry crest and offer no obstruction to the passage of water. The flanks of the anicut are sloped at 1 in 23.21 on the left and at 1 in 23 on the right side. For purposes of calculation the slope on both sides is taken as 1 in 23."

In 1925 three feet falling shutters were removed and six feet falling shutters of Zifta weir type were installed. This change is noted in "College of Engineering Manual, Irrigation" by Ellis (Ex. APK-640) at page 424, paragraph 579-A. It is stated in that Manual that :—

> "Due to increased demand for water in the expanding delta, the three feet falling shutters of the type shown in Fig. 131, were removed and 6 feet falling shutters of Zifta weir type installed on the Kistna anicut at Bezwada in 1925. They are made up of 29 sets of 11 shutters each, a single shutters being 10 feet long.
>
> The total length comes to 3193'4-1/4" including the spaces between the shutters. These spaces are closed up with canvass staunching frames during seasons of scarcity. These shutters are intended to maintain water over the crest of the anicut upto 6 feet. They are tripped set after set as water rises above 6 feet until all the sets are down. The tripping of these sets is effected by hydraulic pressure maintained and worked from Seetana-

(1) Introduction to Hydrometeorology by Bruce and Clark—page 80 (First edition, 1966 and reprinted in 1969).

garam and Bezwada side valve houses, for each of the two valves of the anicut by means of separate pipe connections taken to the first shutter (master shutter) of each set. As soon as the master shutter is tripped by the application of pressure from the valve house, the other ten shutters connected to this with axles and clutches will also fall down one after the other.

When the water level begins to go down below 6 feet raising of the shutters set after set is done by means of travelling machine otherwise called 'plough' which is worked by steam power.

In the off-position the shutters lie flat on the masonry crest of the body wall, the plough moving forward on its track on the anicut catches up the roller in the middle of the free end of the shutters. This roller moves along over an inclined track in the plough so that as the plough goes forward, the shutter rises to its vertical position".

Formulae as given in the Kistna Reservoir Project, Vol. II at pages 2 to 9, paragraphs 5 to 13(1) were being applied for calculating the discharge at Vijayawada Weir. These formulae made certain assumptions regarding the velocity of approach which are given in paragraph 6 at pages 2-3 of the said report. The formula for Anicut discharge with clear overfall is given in paragraph 7. The Krishna Anicut was taken as submerged when the flow was 6 feet above the crest and the formula for discharge calculations on submerged Anicut as given in paragraphs 8 and 9 at pages 5 to 7 of the said report was being applied. Methods for calculating discharges of undersluices and canals are mentioned in paragraph 12 and 13 at page 8 of the said Report. According to Annexure II of the Report of the Krishna Godavari Commission, there were some minor changes in these formulae from time to time.

Annexure II to the Krishna Godavari Commission Report at pages xiv and xv in paragraph 8 gives the details of the manner in which the discharges over the Anicut were computed after 6′ shutters were installed in 1925. The Krishna Anicut was divided into the following five parts :—

(a) The central portion of the Anicut 3,193.35 feet long, is in the form of a weir with a crest width of 6.0 feet with a 20 feet extension upstream at a slightly lower level. It had six feet high automatic shutters on top of the crest. The top level of the shutters was R.L. 53.05 and the effective crest level, when the shutters were down, was R.L. 47.22.

(b) The Vijayawada side level flank, 174.33 feet long with crest at R. L. 53.05.

(c) The Vijayawada side sloping flank, 108.92 feet long with crest rising from R.L. 53.05 to R.L. 57.40, at a slope of 1 in 25.04.

(d) The Seethanagram side level flank, 156 feet long, with crest at R.L. 53.05.

(e) The Seethanagaram side sloping flank, 126 feet long, with crest rising from R.L. 53.05 to R.L. 58.30, at a slope of 1 in 24.

The discharge Q over the Anicut was calculated when the down stream water level was below the crest level by applying the formula —

$$Q = 3.1\ L[(H - h_a)^{3/2} - h_a^{3/2}] \quad .. \quad .. \quad (1)$$

When the downstream level was above the crest level of the Anicut, the discharge O was calculated by applying the formula —

$$Q = 3.1\ L[(h - h_a)^{3/2} - h^{3/2}] - CLD \sqrt{2g(h - h_a)} \quad .. \quad (2)$$

The values of L, H, h, ha, and d are as mentioned in paragraph 8 of Annexure II. Thus it will be seen that whenever downstream water level was above the crest level the second formula was applied. This method of calculating the discharges is the main point of controversy between the parties.

There was a breach in the Krishna Anicut in the year 1952 and in its place construction of the Krishna (Prakasam) Barrage was sanctioned. The construction of the Krishna (Prakasam) Barrage started in the year 1953 and was completed in the year 1962.

There is a serious controversy between the parties with respect to the dimensions of the Krishna Anicut which is no more in existence, the formulae employed in calculating the discharges of the water flow over the Anicut and the gauge or gauges with reference to which calculations were made. We proceed to refer to the nature of controversy between the parties on these points.

The case of the State of Maharashtra regarding the assessment of discharge of the Krishna river at Vijayawada Weir is set out at pages 9-18, paragraphs 2.2.1 to 2.2.5 of MRK-Vol. I. It has been stated in paragraph 2.2.5 that Shri Venkatacharya, Chief Engineer of Madras had stated in the 1951 Conference that discharge figures of the Krishna river which had been worked out in the Central Water and Power Commission note were under-estimated by about 8 per cent. This together with the correction for inclusion of the higher yield for years 1945 to 1950, showed that the estimated 86 per cent dependable yield would have been 1977 T.M.C. (rounded to say, 2000 T.M.C.) instead of 1715 T.M.C. (rounded to 1745 T.M.C.) as adopted by the Planning Commission for the supplies at 86 per cent dependability only. The 75 per cent dependable yield would be much more approximately 2200 T.M.C. It is stated that this figure has been confirmed since then by the three dimensional model experiments carried out at the Central Water and Power Research Station, Poona in 1967-68, on the basis of which the Central Water and Power Commission has reconstructed the flow data at Vijayawada. According to that study the 75 per cent dependable flow at the river Krishna at Vijayawada comes to 2176 T.M.C.

It is further stated that the Krishna Godavari Commission has also given the run off figures for the subsequent years 1951-52 to 1959-60 and that if these 10 years are added to the previous 50 years, the 75 per cent dependable yield would increase to 2188 T.M.C. which may be rounded off to approximately 2200 T.M.C., as the 75 per cent dependable flow at Vijayawada including the existing utilisations. The concluding part of paragraph 2.4.5 is as follows :—

> "Thus, in the view of the Maharashtra State, the best estimate (as of date) of the available total flows at Vijayawada on the basis of 75 per cent dependability would be 2200 T.M.C."

The State of Mysore has also adopted this estimate as the correct estimate of the flow of the river Krishna at Vijayawada. Reference in this connection may be made to pages 57—59, paragraph 3 in MYK-Vol. III.

The case of the State of Andhra Pradesh is set out in the rejoinder of the State of Andhra Pradesh to the statement of the case of the State of Maharashtra (APK-III) pages 42 to 62, paragraphs 4.2.1 to 4.7.4. Paragraphs 4.2.3, 4.2.4, 4.5.21, 4.6.1, 4,6.2 and 4.6.3 reproduced below give the gist of the case of the State of Andhra Pradesh :

"4.2.3. Gauge readings were being observed meticulously thrice a day, i.e., at 6.00 AM, 12.00 Noon and 6.00 PM on the upstream and downstream of the anicut both on Vijayawada side and Seethanagaram side of the river. The position of the shutters and number of shutters lowered were also recorded every time the gauges were read. Laborious calculations were being made to get the averages of Vijayawada and Seethanagaram gauges at all times and to get from those the weighted average gauge readings for the day and night and the weighted average lengths of shutters down.

4.2.4. Daily discharges were being calculated from the above using the free overfall and submerged weir flow formulae then in vogue The coefficients in the formulae were fixed taking into consideration the flow condition, upstream bed condition, the velocity of approach etc. by responsible engineers. Change in the section of anicut along its length at its ends, such as sloping lengths etc., were also taken into consideration in fixing the values of coefficients and arriving at the correct discharges. Systematic tables were prepared for calculating the discharges for every 0.01 foot of the weighted gauge readings for mechanical application, to save time, and to avoid the possibility of personal errors in calculations. The formulae adopted were clearly described in Krishna Reservoir Project Report Vol. II, printed in the year 1911. Attempts were also made once in 1913 and again in 1936 to give necessary corrections to the coefficients in the formulae, to take into account the change, in the upstream bed conditions and the velocity of approach in the river. From the above it can be seen that discharges observed at Vijayawada were done very carefully, accurately and scientifically.

4.5.21. Discharges of rivers are being measured all over the world and in India, by continuous current meter gaugings. Therefore the only method of estimating the dependable flow of a river of this magnitude is by continuous current meter gaugings for a sufficiently long period, and it was precisely that, that was recommended by the Krishna Godavari Commission. Unless and until it is done, it is not prudent to discard the valuable data observed over a very long period and preserved for the posterity.

4.6.1. The Maharashtra stated that, if the flow data were reconstructed for the years from 1951-52 to 1959-60, the 75 per cent dependable flow will be increased to 2,183 Thousand Million Cubic Feet, or approximately 2,200 Thousand Million Cubic Feet, which is the best estimate of the available total flows at Vijayawada in their view.

4.6.2. In this context it is to be stated that the Krishna Anicut breached in 1951 and the construction of the barrage was undertaken soon and therefore the observations of the discharges at the anicut site were vitiated for this period. In spite of that, the readings at Vijayawada anicut were being recorded regularly as before the breaching of the Anicut, and the discharges were also calculated in the field as per the old method without taking into account the disturbed flow conditions. These calculations are only very rough and cannot be relied upon.

4.6.3. It is also to be mentioned that we have to establish first the correctness of the dependable flow upto 1951 only, because it has been questioned and the subsequent data will not be of any use for this."

The State of Andhra Pradesh has also challenged the model experiments performed in 1967 at Poona on several grounds, as set out in paragraph 4.5 of APK-III, pages 54 to 61.

As the case progressed the State of Maharashtra set up an alternative case, the details of which are given in Chart No. C-66 which is on record.

The alternative case of the State of Maharashtra is that in the event of the Tribunal holding on the facts and circumstances of the case that the results of the model experiments performed at Poona in 1967-68 duly corrected for the changes in the weir cannot be made to give a reasonably accurate estimate of the dependable flow of the Vijayawada Weir the M.D.S.S. formula should be suitably modified as the submerged flow formula was wrongly applied to the heads of water over the weir from 6′ to 22′ (or above), except for the days on which the submerged flow actually occurred. It was further submitted that for calculating the discharge over the standing shutters the coefficient of discharge must be taken to be 3.33 and not 3.1. The State of Mysore also adopted the alternative case of the State of Maharashtra.

The rejoinder of the State of Andhra Pradesh to this alternative case is set out in Chart No. C-47 which is on record. The contention of the State of Andhra Pradesh is that the use of the constant value of 3.1 as coefficient in the formula is not correct. The State of Andhra Pradesh has submitted at page 2 of this Chart the varying values for C in the formula $Q = CL\ [(H+h_a)3/2 - h_a3/2]$ which according to it may be adopted in modifying the formula.

It is stated that :—

"Considering all the above, the State of Andhra Pradesh submits that the following varying values may reasonably be adopted for C for different heads in the formulae for discharge over weirs for any reconstruction of discharges to be made using the available gauge data".

The varying values of C mentioned by the State of Andhra Pradesh are given below :—

Range of Head	Value of C Pre-1925 in the formula $Q = CL[(H+ha)3/2 - ha3/2]$	Value of C Post-1925 in the formula $Q = CL[cH+ha)3/2 - ha3/2]$
0′-3′ . .	2.65	2.60
3′-6′ . .	2.80	2.75
6′-9′ . .	2.90	2.85
9′-11′ . .	3.08	3.03
11′-14′ . .	3.17	3.12
above 14′ . .	3.20	3.15

It is to be noted that the State of Andhra Pradesh has made a distinction between pre-1925 and post-1925 period, as its case is that the cross-section of the Anicut in the post-1925 condition had got more kinks and also had an upstream vertical retaining wall.

On the 5th October, 1972, during the course of arguments, the Advocate General of Maharashtra and the counsel for the State of Mysore submitted a signed statement which runs as follows :—

"1967, 3 D Model Experiments of C. W. & P. R. S. Poona.

The principal objections urged by Andhra Pradesh to using the results of 3 D model Experiments to reconstruct the recorded gauge data are :

I. (a) The 3 D model was not geometrically similar to the prototype.

(b) Consequently kinematic and dynamic similarity is not secured.

(c) The model is not proved

(i) Because it is not geometrically similar and

(ii) Because there was no prototype data available for the year 1932 at the time of 1967 experiments for the Sitanagaram u/s gauge and therefore the reading of the Sitanagaram u/s gauge in the model was based on a statistical study for the years 1933 to 1950. The actual gauge data of the year 1932 which became subsequently available after 21st March, 1969 show that there is a wide disparity between the statistically determined gauge readings and the actual gauge readings of the Sitanagaram u/s gauge on the prototype. Consequently the model is not proved.

(d) The u/s approach should have been reproduced upto 2 miles. In any event, the reproduction of 1 mile u/s approach was not adequate as it did not correctly simulate the flow pattern in the model.

(e) The method of independent variables cannot be applied so as to correct the geometrical dissimilarity between the model and the prototype; at any rate the method cannot be applied to all the features in the geometry of the Vijayawada Weir.

11. The States of Maharashtra and Mysore have carefully considered these objections and the evidence on record. Having regard to the undisputed fact that before the results of 3 D model experiments can be acted upon, the model must be proved, the States of Maharashtra and Mysore are not able to maintain that the model can be said to have been proved in view of the very great disparity between the readings of the u/s Sitanagaram gauge on the prototype as disclosed by the recorded data made available after the 21st March, 1969 and the readings of the u/s Sitanagaram gauge on the model having been based on a statistical study of data for the years 1933-50. Under the circumstances the States of Maharashtra and Mysore do not rely on the 3 D model experiments for reconstructing the Vijayawada recorded discharge data."

There may be other reasons also for not relying on the 3 D model experiments. But whatever the reasons may be, in view of the statement made by the learned Advocate General of Maharashtra and the learned counsel of Mysore, the case of the States of Maharashtra and Mysore that on the basis of the results obtained from the aforesaid experiments the flow at Vijayawada should be estimated at 2176 T.M.C. does not stand and need not be considered.

The only case that we have now to examine is the alternative case set up by the State of Maharashtra. On a careful examination of the alternative case and the rejoinder of the State of Andhra Pradesh it is clear that so far as the matter of calculating the discharge over the standing shutters is concerned, all the parties are agreed that the coefficient of discharge C may be taken as 3.33 in the formula — $Q = CL$ $[(H + ha)^{3/2} - ha^{3/2}]$. We may also mention that initially there was some controversy about the value of the velocity of approach, but at the final stage of the arguments the parties agreed that in calculating the discharges after 1925, the velocity of approach may be taken to be as mentioned in Annexure II to the Krishna Godavari Commission Report page xvi. Parties are also agreed that for non-modular flow the discharge may be calculated according to the formula mentioned at page xvi, paragraph 8(iii) B of Annexure II to the Krishna Godavari Commission Report. Parties are also broadly in agreement regarding the utilisations made by each State every year from 1901-02 to 1968-69.

For the period 1929 to 1951, complete gauge data for calculating the discharge over Vijayawada Anicut are available on the record of the Tribunal. If the modular limit and the value of the coefficient of discharge are determined the annual discharge of the river Krishna over the Krishna Anicut for the period 1929-30 to 1950-51 can be calculated from that data. But this will furnish annual discharge data only for 22 years. The engineers of the States of Maharashtra, Mysore and Andhra Pradesh were requested to calculate the annual discharge for the period 1929-30 to 1950-51 (a) taking the flow to be non-modular on days when the afflux was less than 1' as given in C.W.P.C. (K)-5 at pages 170 to 173 (b) applying to the formula for modular flow $Q = CL[(H + ha)^{3/2} - ha^{3/2}]$ the following values of C :—

0-3'	...	2.60
3-6'	...	3.75
6-9'	...	3.00
9-11'	...	3.10
above 11'	...	3.20

(c) adopting the formula for non-modular flow as mentioned in the Krishna Godavari Commission Report Annexure II and (d) taking the agreed value of the velocity approach and agreed value of the coefficient for flow over the standing shutters. They submitted a document containing these calculations from which the 75 per cent dependable yield works out to 2065 T.M.C.

Realising that it will be better if from the material on record, the annual discharge for a longer period may be determined, the parties made certain submissions which are incorporated in the notes submitted by them.

The States of Maharashtra and Mysore submitted that for the four years 1925-26 to 1928-29, as the record of individual readings of both upstream gauges are not available, the available record containing averages of the two upstream gauges may be utilised not only for computing the discharge over the central portion, but also discharge over the flanks taking the average of the two gauges as representing the individual readings of the two upstream gauges. This method of computing discharge will give results with sufficient accuracy for all practical purposes. This contention is contained in paragraph 3 of MR Note No. 1 filed on the 26th March, 1973.

The States of Maharashtra and Mysore further submitted that the recorded data over the Krishna Anicut from the years 1951-52 to 1960-61 and the discharge data gauged by the State of Andhra Pradesh on the Krishna (Prakasam) Barrage (which came into operation in 1961) for the years 1961-62 to 1970-71 may be taken into account without making any modifications. The case of the States of Maharashtra and Mysore on this point is summed up in paragraphs 5, 6 and 7 of MR Note No. 10 filed on the 5th April, 1973. The State of Andhra Pradesh has, however, raised objection to the inclusion of the recorded data for these years. It has, however, submitted that discharge data for the years 1901-02 to 1924-25 may be calculated by applying the modified formula taking the gauge readings given in the printed register Ex. APK-616 for the period 1901-02 to 1924-25 which according to it represented the average of the readings of the two upstream gauges. Alternatively the State of Andhra Pradesh submitted that annual discharge data so arrived may be increased by 2.29 per cent. Ultimately it submitted in AP Note No. 10 filed on the 3rd May, 1973 that in view of the factors mentioned in that note, Andhra Pradesh had no objection for making an overall positive correction of +5 per cent for the annual flows over the Anicut for the period 1901-02 to 1924-25 as given in Column 3 of Annexure II of AP Note No. 2, dated the 30th March, 1973.

It was also for our consideration whether the discharge data mentioned in the Krishna Reservoir Project Volume II for the years 1894-95 to 1900-1901 should be taken into consideration or not.

With the able assistance of the parties and after thorough examination of all the material on record and after a careful consideration of the matter, the Tribunal directed that the series of discharge data from 1894-95 to 1971-72 be prepared on the lines indicated by the Tribunal which represented the views of the Tribunal on all matters in controversy between the parties. The States of Maharashtra, Mysore and Andhra Pradesh submitted on the 4th May, 1973 separate documents marked X (Ex. MRK-342), Y (Ex. MYK-303) and Z(Ex. APK-696)(1) containing the annual flow series at Vijayawada for the years 1894-95 to 1971-72. The 75 per cent dependable flow from each of these series works out to 2,060 T.M.C.

After scrutinising the documents the parties submitted an agreed statement stating that the 75 per cent dependable flow of the Krishna river at Vijayawada for the purpose of the case may be adopted as 2060 T.M.C. This statement which is Ex. MRK-343 is set out at the end of this Chapter. It is a matter of great satisfaction that the dispute on a very crucial matter in the case which had been the subject matter of serious controversy between the parties and which was mainly responsible for the prolongation of the trial in this case has been thus satisfactorily resolved. We place on record our appreciation of this attitude adopted by the parties.

Conclusion.—The Tribunal hereby determines that for the purpose of this case the 75 per cent dependable flow of the river Krishna upto Vijayawada is 2060 T.M.C.

Sub-issue No. 1 of Issue II is partly decided as aforesaid. The other aspects of this issue are discussed separately.

Exhibit MRK—343

In view of the documents marked X, Y and Z containing the 78 years' flow series, filed by the three States, the parties are agreed that the 75 per cent dependable flow be adopted as 2060 T.M.Cft. for the purpose of this case.

Sd/-

P. Ramachandra Reddi, for Andhra Pradesh.

4-5-73

Sd/-

T. Krishna Rao, for the state of Mysore.

4-5-73

Sd/-

H. M. Seervai for the State of Maharashtra.

4-5-73

(1) These documents are reproduced as Appendices O, P and Q, respectively.

CHAPTER X

Return flow

Return flow.—Return flow or regeneration from river water diverted for beneficial uses is that portion of diverted water which eventually finds its way to the river from which it is diverted. Return flow is a relevant factor to be considered in making an equitable apportionment of river water. Most of the return flow in the Krishna river comes from water diverted for irrigation.

Return flow from irrigation.—Return flow from irrigation includes drainage from excess percolation during irrigation, surface run off during irrigation as well as drainage from canal seepage, leakage at canal structures, wasteway discharges during conveyance and discharges at the lower ends of canals.(1)

When water is applied to a field, a part of the water is rapidly absorbed by the soil. After the sub-soil is saturated and wetted to field capacity, additional water seeps underground by the force of gravity. If sufficient percolation occurs, the water table rises and water in increasing quantities flows back to the stream as invisible return flow.

Contentions regarding return flow from irrigation water.—It is the common case of the parties that a part of the water withdrawn from the stream for irrigation is consumptively used and a part returns to the stream.

It is Maharashtra's case(2) that return flow from new irrigation projects in the Krishna basin will be of the order of 30 to 40% of the diversions and will appear within a short time and that this return flow should be taken into account in determining the dependable flow of the river Krishna.

It is Mysore's case(3) that it is difficult to determine the exact extent and time of appearance of return flow. In view of the uncertain character of return flow, it is desirable to evolve a method by which its effect may be automatically accounted for and each State may get its due share of the return flow.

It is Andhra Pradesh's case(4) that regeneration is an uncertain factor and should not be taken into consideration in allocating the river flow.

Return flow varies from region to region and from time to time.—The magnitude of return flow from irrigation depends upon a number of variable factors such as method and efficiency of irrigation and conveyance, soil type, underlying geological formations, topography, climate, temperature, evaporation and use of groundwater and varies widely from region to region and from time to time.

Studies of return flow in U.S.A.—In U.S.A., systematic measurements of return flow in several river valleys have been made since 1885.(5) Studies of return flow in U.S.A. show that 16 to 70% of the water diverted for irrigation returned to the stream after use for irrigation.(6) The latest estimate made in 1968 shows that about 40% of the water withdrawn for irrigation returns to the stream.(7)

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(1) Ivan E. Houk, Irrigation Engineering (1951) Vol. I, p. 411.
(2) MRK I pp. 21-25; MRK II pp. 40-41, 50-59.
(3) MYK IV p. 7
(4) APK III pp. 62-69.
(5) Ivan E. Houk, Irrigation Engineering (1951) Vol. I, p. 412.
(6) E. Kuiper, Water, Resources, Development, Planning Engineering and Economics (1965), pp. 14, 342.
Robert W. Abbett, American Civil Engineering Practice (1956) Vol. II, p. 17.
Ivan E. Houk, Irrigation Engineering (1951) Vol. I, p. 415.
R.K. Linsley, M.A. Kohler, J.L. H. Paulhus, Applied Hydrology (1949), p. 217.
(7) L.J. Erie—Management, A Key to Irrigation Efficiency, Journal of the Irrigation and Drainage Division, Proceedings of the American Society of Civil Engineers Vol. 94 No. IR. 3 September, 1968, p. 255. In Canada also irrigation consumes only 60% of delivered water, J.G. Nelson and M.J. Chambers, Water—Process and Method in Canadian Geography, p. 15

Quality of return water.—Increased concentration of dissolved minerals and salts in the return flow from irrigation, particularly in arid and semi-arid regions may cause salinity problems downstream. Extreme water quality deterioration below tolerance level is injurious to crop growth.(8) However, the salinity has little effect, when the saline water is diluted by relatively large river flows(9) or by mixture with fresh water in large reservoirs.

Return flow in U.S.A. inter-State Water controversies.—In the earlier cases(10) due to lack of definite data on the subject, the U.S.A. Supreme Court was unable to determine how much of the water used for irrigation returned to the stream. However in one of these cases,(11) the Court was satisfied on the evidence that as respects irrigation is a part of the river valley the return water would more than counterbalance the loss through evaporation and otherwise when the period of storage was not more than from one year to the next.

In later decisions, the Court recorded definite findings with regard to the rate of return flow. In the litigation concerning North Platte river,(12) the Court found that in Jackson County, Colorado, the diversions were about 4-1/2 acre feet per acre, but the average consumptive use rate was .74 acre foot only. The consumptive use represented the difference between the water diverted and water which returned to the stream after use for irrigation. The Court determined the consumptive use rate in other sections of the river valley also. In the section Pathfinder to Whalen, the consumptive use rate was 1.1 acre feet per acre, while the diversion rate was 2.5 acre feet per acre and, out of the total seasonal headgate diversion of 35,000 acre feet, 18,200 acre feet was returned to the river.

The decree in a case decided in 1963(13) contained a comprehensive scheme for allocation of water in terms of acre feet of annual consumptive use which was defined as diversions from the stream less such return flow thereto as was available for consumptive use in the United States or in satisfaction of the Mexican Treaty obligation.

U.S.A. researches on time of appearance of return flow.—Observations in U.S.A. indicate that return flow from a new irrigation project may begin within a few years after initiation of the project, but may not reach its full magnitude until after 10, 20 or even 30 years following the beginning of irrigation.(14)

India.—The Indian Irrigation Commission observed(15) that the percentage of irrigation water returning to the river was probably very much less in India than was indicated by observations made in America.

Indus Valley.—The Indus Commission(16) held that regeneration was an uncertain factor and could not be depended upon to reduce the shortages in river supplies required for certain projects. The Indus Treaty took into account the average historic gains between Ferozepur and Islam on the Sutlej.(17) Henry Olivier(18) has observed :

> "In territories such as India and Pakistan where perennial irrigation is practised on a vast scale, combined losses of the order of 40% from deep percolation and regeneration seepage constitute major factors not merely as regards the relatively short-term economics of water/land use, but in the progressive qualitative change of water and soils. Preliminary estimates put the annual recharge

(8) Ven Te Chow, Handbook of Applied Hydrology (1964) pp. 19-25, 19-31; O.W. Israelsen and V.E. Hansen, Irrigation Principle and Practices 3rd Ed., pp. 223-229, International Association for Water Law, Annales Juris Aquarum (1968), p. 16; A.H. Garretson and others, The Law of International Drainage Basins (1967), pp. 579-581; The Nations Water Resources, U.S. Water Resources Council (1968), p. 3-3-5.

(9) Lloyd v. Wilcox, Effect of irrigation on stream water quality (U.S. Department of Agriculture), pp. 169-173.

(10) Kansas v. Colorado 206 U.S. 46, 107 (1907) (Arkansas river litigation); Wyoming v. Colorado 259 U.S. 419, 483; (1922); 298 U.S. 573, 581-582 (1932) (Laramie river litigation).

(11) Wyoming v. Colorado 259 U.S. 419, 483.

(12) Nebraska v. Wyoming 325 U.S. 589, 600, 603 (1945)

(13) Arizona v. California 373 U.S. 546 (1963); 376 U.S. 340 (1964) (Colorado river litigation).

(14) Edward Kuiper, Water Resources Development (1965) p. 349; Ivan E. Houk, Irrigation Engineering (1951) Vol. I, pp. 412-416 C.V. Davis, Handbook of Applied Hydraulics 2nd Ed. (1952), p. 785; Transactions of American Society of Civil Engineering, Vol. 94 (1930) p. 338 Paper No. 1730.

(15) Report of the Indian Irrigation Commission (1901-1903), Vol. I, p. 13.

(16) Report of the Indus (Rau) Commission, Vol. I, pp. 54-55, 82-91.

(17) *See* para 23 and 24 of Annexure 'H' to the Indus Waters Treaty; N.D. Gulhati, Development of Inter-State Rivers (1972), p.90.

(18) Henry Olivier, Irrigation and Water Resources Engineering (1972), p. 14;
See also N.D. Gulhati, Indus Waters Treaty (1973), pp. 29, 237.

of groundwater in the northern zone of West Pakistan at approximately 25 x $10^6 m^2$ to $47 \times 10^6 m^2$ (20-38 million acre-feet) and in the southern zone it is estimated to be about half this amount."

Special considerations affecting return flow in the Krishna basin.—(1) The Krishna valley lies in a latitude of 13°7' to 19°20' N and has a tropical climate. The mean annual temperature is 24°C (75°F) to 29.4°C (85°F), the average annual potential evaporation 71 to 150 inches and the weighted average rainfall 30.9" (784 mm) in a catchment of 99,980 square miles.

(2) Most of the canals in the Krishna basin are unlined. There is heavy percolation loss from unlined canals.

(3) A part of the water of the Krishna river system is diverted outside the Krishna basin for purposes of irrigation and power production. There is no return flow in the Krishna river from water diverted outside the Krishna basin.

(4) All the parties have stated that they will be free to use the underground water within their respective territories. Extensive withdrawal of groundwater from wells may lower the water table and reduce the return flow.

Assessment of return flow from irrigation in the Krishna valley :

(1) *Nira Valley.*—Studies of return flow in the Nira Valley (19) in rabi and hot wether seasons during 1941-42, 1943, 1944-45, 1945-46 showed that 18.1 to 51.4% of the water diverted for irrigation returned to the stream in water-logged areas and under conditions of lavish and excessive application of water. Another study during hot weather season of 1953-54 revealed that the return flow was of the order of 3 to 4% only. The year 1953 was preceded by a year of extreme scarcity of rainfall.

About 5,400 acres of sugarcane and 15,500 acres of seasonal crops are being irrigated on the banks of the Nira river below Vir Dam and up to confluence of the Nira with the Bhima by lifting water from the available river flow and regeneration flows in the Nira river. No water is let down from Vir storage during the non-monsoon season.(20)

(2) *Project reports.*—Several project reports give estimates of return flow in the Krishna basin varying from 4 to 10% of the water diverted for irrigation.(21)

(3) *Krishna Godavari Commission Report.*—The Krishna Godavari Commission observed that although little statistical data were available, it could be stated from general considerations that the contribution to groundwater from irrigation channels and irrigated fields might be as large as and sometimes even much more than the quantity actually utilised by crops. Considerable theory and many precedents could be cited in support of the fact of such regeneration. However the quantum of regeneration varied widely from one set of conditions on one river to a different set of conditions on another. No practical benefit could be derived from regeneration in the optimum development of the waters of any rivers system unless data of daily flows at number of sites along the river were available and were analysed to determine the actual quantum of regeneration. The Commission concluded that until regular gaugings were established at key sites on the river system and results of each gaugings were available for a number of years (in no case less than ten), they could not give any quantitative assessment of regeneration.(22)

(4) *No assessment of return flow in the Krishna basin on a regional basis by following normal method.*—A common method of assessing return flow on a regional basis is to ascertain the daily flows at key points on the river system for a number of years and to analyse the data in the light of the areas irrigated, depths of irrigation, rainfall, sub-soil water levels and other geological, hydrological and meteorological data.(23)

(19) Reports on Irrigation and Allied Research, PWD, Bombay, 1941-42, 1943, 1946, 1953-54. (Pranji's evidence pp. 356-437).

(20) MRPK XXXI, p. 6.

(21) Report of Rajolibanda Diversion Scheme (erstwhile Hyderabad State) APPK Vol. 16, pp. 1-2.
Mysore Note on Upper Tunga Project MYPK Vol. VIII p. 97, Mysore Note on Tungabhadra Reservoir Foreshore Lift Irrigation MYPK Vol. VIII p. 115, Kistna Pennar Project Report, (1951 Scheme) Madras State Vol. I, Page 10; APPK-Vol. II p. X; Report of the Lower Krishna Project Nandikonda site of the erstwhile Hyderabad State p. 16, APPK-Vol. X, p. 16;
Report of the Bhima Irrigation Project, Govt. of Maharashtra Vol. I p. 18, Vol. IV p. 9; MRDK-Vol. 21 p. 18; MRPK-Vol. 23 p. 9

(22) Report of the Krishna Godavari Commission, pp. 129, 138-139, 158.

(23) See Annual Report (Technical) of the Central Board of Irrigation and Power, India 1945, p. 134; Report of the Krishna Godavari Commission, pp. 129,138-139; see also Groundwater Studies Edited by R.H. Brown and others UNESCO 1972 p. 5.4; D.V. Joglekar Irrigation Research in India, pp. 142-145, Publication No. 78, Central Board of Irrigation and Power.

So far, the return flow in the Krishna basin has not been assessed on a regional basis by adopting this method.

(5) *Oral evidence.*—Mr. Framji, an expert witness, has made an estimate of return flow from new irrigation projects in the Krishna basin.

Mr. Framji's evidence.—On the subject of return flow, the State of Maharashtra called Kavasji K. Framji as an expert witness. In connection with the Sind Punjab dispute before the Indus Commission and the preparation of the Lower Sind Barrage Project, Mr. Framji made an intensive study of the projected return flows between Sukkur and Kotri, the off-take of canals for the Lower Sind Project and the return flows which could be used in the Lower Sind Barrage Canals. Recently, in connection with the Indo-Pakistan negotiations over the waters of the Ganga and the eastern rivers, studies of return flows between Farakka and Hardinge Bridge were made under his direction and supervision. He has also made an intensive study of the literature concerning return flows in U.S.A. and India. In his opinion(24) through return flow may take 10 to 30 years after the beginning of irrigation to reach its full magnitude, on making a safe and conservative estimate, 10% of the annual diversions by new irrigation projects is likely to apear as return flow within 5 years of the coming into operation of the new projects. The return flow will appear somewhere downstream and will be trapped in one of the large storage reservoirs in the Krishna basin. An equitable apportionment of river water should take into account a reasonable minimum allowance for regeneration from new projects. His opinion is based on (1) his own knowledge and experience, (2) published reports on return flow in U.S.A., (3) observations regarding return flow in the Indus basin, (4) reports on measurments of return flow in the Nira Valley, (5) data given in the Krishna Godavari Commission Report and (6) estimates of return flow in project reports. Counsel for the State of Mysore did not cross-examine the witness. Counsel for the State of Andhra Pradesh cross-examined Mr. Framji, but no expert witness was called to rebut his evidence.

According to Mr. Framji, assuming an annual dependable flow of 2,200 T.M.C. up to 1951 and an annual diversion of 1,215 T.M.C. for projects coming into operation after 1951 and contributing return flows, 120 T.M.C. of return water will be added to the dependable supply of the Krishna river.

Measurement of use of water for irrigation and effect of return flow.—It is common case before us that the use of water for irrigation should be measured by the quantity of water diverted from the river without deducting the water that may return after such use to the river, because on such diversion there is immediate depletion of the river supply to the extent of the water diverted. Accordingly, we propose to direct in our final order that save as provided therein, a use shall be measured by the extent of depletion of the waters of the river Krishna without deducting in the case of use for irrigation the quantity of water that may return after such use to the river.

As and when return water from irrigation use appears in the river, the river supply is augmented and the additional water becomes available for subsequent use. Our task is to ascertain, if possible, the quantity of water that will be added to the 75 per cent dependable flow of the river Krishna up to Vijaywada on account of return flows in the near future and to make an equitable apportionment of the additional river supply between the three States.

Estimate of Return Flow and equitable apportionment.—We have determined that the 75% dependable flow of the river Krishna up to Vijayawada is 2,060 T.M.C. This dependable flow was ascertained after taking into account 78 years' flow series from 1894-95 to 1971-72. In this flow series, the upstream utilisations for the years 1969-70 to 1971-72 have been assumed to be the same as in 1968-69, disregarding the extra utilisations, if any, after 1968-69 as further details were not on the record.(25)

After 1968-69, there is and will be gradually increasing utilisations by the States of Maharashtra, Mysore and Andhra Pradesh for irrigation within the Krishna basin. The excess utilisations after 1968-69 will yield substantial return flow. No part of this return flow is reflected in the dependable flow of 2,060 T.M.C.

There were elaborate discussions with Counsel and technical representatives of the parties concerning return flow and the method of its ascertainment and allocation. The summary of the discussions is embodied in the minutes of the proceedings of the Tribunal on the 12th October, 1973 and is set forth below :—

(1) The parties agree that a percentage of the excess utilisations for irrigation in the Krishna basin

(24) Framji's evidence pp. 1-5, 317-475, 1127-1135, 1141, 1148-1185, 1200-1204, 1234-1235, 1294-1302, 1305-1313, 1649-1650.
(25) EX. MRK—343, 342, MYK—302, APK—696.

from projects using 3 T.M.C. or more will appear as return flow and will augment the 75 per cent dependable flow of 2,060 T.M.C. up to Vijayawada.

According to Maharashtra, the percentage should not be less than 10 per cent ; according to Mysore, the percentage should not be less than 20 per cent ; and according to Andhra Pradesh, it should be 4 per cent.

(2) According to Andhra Pradesh, the excess utilisation should be taken to be the excess of the utilisation after 1968-69 over the utilisation in 1968-69.

According to Maharashtra, the excess utilisation should be taken to be the excess of the utilisation after 1968-69 over the utilisation in 1964-65.

According to Mysore, the excess utilisation should be taken to be the excess of the utilisation after 1968-69 over the average of all the utilisations from 1894-95 to 1968-69.

(3) All parties agree that in 1964-65 the utilisation for irrigation in the Krishna drainage basin from projects using 3 T.M.C. or more was as follows :—

In Maharashtra	47.77 T.M.C.
In Mysore	80.70 T.M.C.
In Andhra Pradesh	35.36 T.M.C.

(4) All parties agree that in 1968-69 the utilisation for irrigation in the Krishna drainage basin from projects using 3 T.M.C. or more was as follows :—

In Maharashtra . . .	61.45 T.M.C.
In Mysore	176.05 T.M.C.
In Andhra Pradesh . . .	170.00 T.M.C.

(5) The Tribunal will decide what percentage of the excess utilisation will appear as return flow.

(6) The Tribunal will decide how the augmentation of the 75 per cent dependable flow on account of the return flow will be shared by the parties.

(7) The Tribunal will decide when the distribution of the additional 75 per cent dependable flow will take place between the parties and whether it should take place once or more than once during the next period of 25 years.

(8) The parties agree that they will prepare, keep and maintain complete detailed and accurate records of annual uses for irrigation in the Krishna basin from their respective projects using 3 T.M.C. or more.

(9) The parties agree that the excess utilisation for irrigation in the Krishna basin from their respective projects using 3 T.M.C. or more shall be determined on the basis of the records to be so prepared and maintained by them.

The parties agree that the year 1968-69 referred to in paragraph(4) above is the water year commencing on from 1st June 1968 and ending on 31st May 1969.

We may add that the parties also made the following submissions :—

(1) According to Maharashtra, the entire return flow in the Krishna basin should be shared equally by Maharashtra and Mysore.

According to Mysore, each State should get the entire return flow coming from the utilisation for irrigation from its own projects.

According to Andhra Pradesh, the entire return flow in the Krishna basin should be shared equally by all the three States.

(2) Maharashtra and Mysore say that the distribution should take place firstly as from the 1st of June, 1974 and then on the expiry of each succeeding period of five years.

According to Andhra Pradesh, the distribution should take place only once, that is to say, on the 1st of June, 1979.

For the limited purposes of ascertaining return flows and distributing the additional 75% dependable flow on account of return flows until our order is reviewed by a competent authority or Tribunal, we decide as follows :—

On a consideration of all relevant materials including the evidence of Mr. Framji and the special features affecting return flow in the Krishna basin and making a safe and conservative estimate, we hold that 7 ½% of the excess of the utilisations for irrigation in the Krishna basin after 1968-69 from projects using 3 T.M.C. or more annually over the utilisations for such irrigation in 1968-69 from such projects will appear as return flow in the Krishna basin and will augment the 75% dependable flow of 2,060 T.M.C. of the river Krishna up to Vijayawada.

We hold that in the water year 1968-69 the utilisations for irrigation in the Krishna basin from projects using 3 T.M.C. or more were as follows :—

In Maharashtra . . .	61.45 T.M.C.
In Mysore (now know as Karnataka) . . .	176.05 T.M.C.
In Andhra Pradesh . . .	170.00 T.M.C.

In our opinion, the additional 75 per cent dependable flow on account of the return flow from the excess utilisations should be distributed between the parties, firstly as from the water year 1983-84, again as form the water year 1990-91 and again as from the water year 1998-99.

We hold that the additional 75% dependable flow on account of return flows available for distribution as from the water year 1983-84 should be computed on the basis of the excess of the average of the annual utilisations during the water years 1975-76, 1976-77 and 1977-78 over the utilisations in the water year 1968-69.

We hold that the additional 75 per cent dependable flow on account of return flows available for distribution as from the water year 1990-91 should be computed on the basis of the excess of the average of the annual utilisations during the water years 1982-83, 1983-84 and 1984-85 over the utilisations in the water year 1968-69.

We hold that the additional 75 per cent dependable flow on account of return flows available for distribution as from the water year 1998-99 should be computed on the basis of the excess of the average of the annual utilisations during the water years 1990-91, 1991-92 and 1992-93 over the utilisations in the water year 1968-69.

In our opinion, it is just and equitable that, in the present scheme of allocation, each State should get the benefit of the additional 75 per cent dependable flow on account of the return flow from the excess utilisations for irrigation from its own projects using 3 T.M.C. or more annually.

We propose to direct that the three States shall prepare, and maintain complete, detailed and accurate records of annual uses for irrigation in the Krishna basin from projects using 3 T.M.C. or more annually.

We hold that all future utilisations for irrigation in the Krishna basin in each water year from the projects of any State using 3 T.M.C. or more annually shall be computed on the basis of the records to be so prepared and maintained by that State.

Our views regarding the 75 per cent dependable flow of the river Krishna up to the Vijayawada and the augmentation of the dependable flow by return flows and their equitable allocation between the three States are reflected in clauses III and V of our final order which are as follows :—

Clause III.

The Tribunal hereby determines that, for the purpose of this case, the 75 per cent dependable flow of the river Krishna up to Vijayawada is 2,060 T.M.C.

The Tribunal considers that the entire 2,060 T.M.C. is available for distribution between the States of Maharashtra, Karnataka and Andhra Pradesh.

The Tribunal further considers that additional quantities of water as mentioned in sub-clauses A(ii), A(iii), A(iv), B(ii), B(iii), B(iv), C(ii), C(iii) and C(iv) of Clause V will be added to the 75 per cent dependable flow of the river Krishna up to Vijayawada on account of return flows and will be available for distribution between the States of Maharashtra, Karnataka and Andhra Pradesh.

Clause V.

(A). The State of Maharashtra shall not use in any water year more than the quantity of water of the river Krishna specified hereunder :—

(i) as from the water year commencing on the 1st June next after the date of the publication of the decision of the Tribunal in the official Gazette up to the water year 1982-83

565 T.M.C.

(ii) as from the water year 1983-84 up to the water year 1989-90

565 T.M.C. plus a quantity of water equivalent to $7\frac{1}{2}$ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1975-76, 1976-77 and 1977-78 from its own projects using 3 T.M.C. or more annually over the utilisation for such irrigation in the water year 1968-69 from such projects.

(iii) as from the water year 1990-91 up to the water year 1997-98

565 T.M.C. plus a quantity of water equivalent to $7\frac{1}{2}$ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1982-83, 1983-84 and 1984-85 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(iv) as from the water year 1998-99 onwards

565 T.M.C. plus

a quantity of water equivalent to 7½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1990-91, 1991-92 and 1992-93 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(B). The State of Karnataka shall not use in any water year more than the quantity of water of the river Krishna specified hereunder :—

(i) as from the water year commencing on the 1st June next after the date of the publication of the decision of the Tribunal in the official Gazette up to the water year 1982-83.

695 T.M.C.

(ii) as from the water year 1983-84 up to the water year 1989-90

695 T.M.C. plus

a quantity of water equivalent of 7½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1975-76, 1976-77 and 1977-78 from its own projects using 3 T.M.C. or more, annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(iii) as from the water year 1990-91 up to the water year 1997-98

695 T.M.C. plus

a quantity of water equivalent to 7½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1982-83, 1983-84 and 1984-85 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(iv) as from the water year 1998-99 onwards

695 T.M.C. plus

a quantity of water equivalent to 7½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1990-91, 1991-92 and 1992-93 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(C). The State of Andhra Pradesh will be at liberty to use in any water year the remaining water that may be flowing in the river Krishna but thereby it shall not acquire any right whatsoever to use in any water year nor be deemed to have been allocated in any water year water of the river Krishna in excess of the quantity specified hereunder :—

(i) as from the water year commencing on the 1st June next after the date of the publication of the decision of the Tribunal in the official Gazette up to the water year 1982-83

800 T.M.C.

(ii) as from the water year 1983-84 up to the water year 1989-90

800 T.M.C. plus

a quantity of water equivalent of 7½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1975-76, 1976-77 and 1977-78 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(iii) as from the water year 1990-91 up to the water year 1997-98

800 T.M.C. plus

a quantity of water equivalent of 7½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1982-83, 1983-84 and 1984-85 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(iv) as from the water year 1998-99 onwards

800 T.M.C. plus

a quantity of water equivalent of 7½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1990-91, 1991-92 and 1992-93 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(D). For the limited purpose of this Clause, it is declared that—

(i) the utilisations for irrigation in the Krishna river basin in the water year 1968-69 from projects using 3 T.M.C. or more annually were as follows :—

From projects of the State of Maharashtra	61.45 T.M.C.
From projects of the State of Karnataka	176.05 T.M.C
From projects of the State of the Andhra Pradesh	170.00 T.M.C.

(ii) annual utilisations for irrigation in the Krishna river basin in each water year after this Order comes into operation from the projects of any State using 3 T.M.C. or more annually shall be computed on the basis of the records prepared and maintained by that State under Clause XIII.

Clause XIII of our final order will provide that each State shall prepare and maintain annually for each water year complete detailed and accurate records of inter alia "annual uses for irrigation within the Krishna river basin from projects using 3 T.M.C. or more annually."

Return flow from municipal water supply and industrial uses.—Studies in U.S.A. and Canada indicate that in those countries municipal water supply consumes 10 per cent of the water diverted and industries consume about 2 per cent. This consumption does not include evaporation losses and loss through discharge into sewage farms or otherwise. If the quality of return water is impaired, the reusability of the water depends on local facilities for purification. (26)

So far, only a small fraction of the waters of the Krishna river is consumed for domestic and municipal water supply and industrial uses.

On the 17th August, 1973 the parties jointly made the following statement :—

"The States of Maharashtra, Mysore and Andhra Pradesh agree as follows :—

The uses mentioned in column No. 1 below shall be measured in the manner indicated in column No. 2 :—

Use	Measurement
Domestic and municipal water supply	By 20 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal.
Industrial use	By 2.5 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal."

On a consideration of all relevant materials, we are satisfied that we should incorporate the following direction in our final order.

"The uses mentioned in column No. 1 below shall be measured in the manner indicated in column No. 2 :—

Use	Measurement
Domestic and municipal water supply . .	By 20 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal.
Industrial use . .	By 2.5 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal."

The question of return flow from these uses will not arise, as they will be measured by the quantity of water consumed by them, in terms of the above direction.

(26) I.J Erie—Management—A Key to Irrigation Efficiency, Journal of the Irrigation and Drainage Division, Proceedings of the American Society of Civil Engineers Vol. 94 I.R. 83 September 1968, p. 285; J.G. Nelson and M.J. Chambers—Water—Process and Method in Canadian Geography p. 15; Van Te Cho-Handbook of Applied Hydrology, pp. 19-24, 19-25.

CHAPTER XI

Inter-State Water Disputes Act, 1956, *and law relating to equitable apportionment of the benefits of an inter-State river*

Jurisdiction of Tribunal.—All disputes concerning the equitable apportionment of the waters of or in the inter-State Krishna river and river valley have been referred to this Tribunal for adjudication. The entire area drained by the river and its tributaries is called the river basin(1). The river basin is also called the river drainage basin. All parties admit that this Tribunal has jurisdiction over the entire surface and underground water of and in the entire Krishna basin. This admission was recorded in our order dated the 4th April, 1973.

Krishna river basin.—Andhra Pradesh argues that the river basin includes all territories outside the river drainage basin to which the waters of the river may be diverted and beneficially applied. It relies on Article II(b) of the Colorado River Compact, 1922 which provided that as used in the compact, "the term 'Colorado River Basin' means all of the drainage area of the Colorado River System and all other territory within the United States of America to which the waters of the Colorado River System shall be beneficially applied". It is to be observed that the purpose of this artificial definition was to authorise certain trans-basin diversions from the Colorado River System(2). The same definition of the Colorado River Basin was repeated in Article II of the Upper Colorado River Basin Compact, 1948. However, in other compacts the term "river basin" was defined to mean the drainage basin or the area drained by the river and its tributaries(3).

The river basin is necessarily completely bounded by the watershed or divide which separates it from other adjacent basins(4). The waters of the river basin can be diverted and beneficially applied to areas in the adjacent watersheds but those areas cannot be regarded as parts of the river basin.

The expressions "Krishna basin", "Krishna river basin" and "Krishna drainage basin" used in this Report mean the entire area drained by the Krishna river and its tributaries. The Krishna basin is bounded by the watershed or divide which separates it from other adjacent basins.

River basin an indivisible physical unit.—Each river basin is an idivisible physical unit, a more or less self-contained unit of drainage(5). Nature's laws treat the river and its tributaries as the arteries of a single circulatory system. The surface streams converge, ever seeking a lower level and unite to form one mainstream. All the waters that find their way towards a common outlet form an interconnected and interdependent system, capable of transmitting within itself any disturbance caused by changes affecting water in any part of the basin. Water is a moving resource which implies that changes in quality or quantity of water in one place may directly affect uses of water somewhere else.

Thus there exists between the manifold uses to which a river may be put a state of interdependence, a very close solidarity(6). There is competition not only among uses at various points of the river, but also among various uses at the same point. The nature of this competition depends on the extent to which there is withdrawal of water at each point. When, for example, water is diverted outside the basin for generating power at an upstream station, downstream irrigation may suffer and villages and towns may be deprived of their drinking water supply. Engineering works at any point of the river system depend upon and in their turn affect the uses to which a river may be put at other points of the system.

(1) See W.G. Moore, Dictionary of Geography p. 24; L. Dudley Stamp, The World 10th Ed. p. 44; Webster's Third New International Dictionary p. 182; The Oxford English Dictionary Vol. I, p. 691.

(2) A.H. Garretson, R.D. Hayton and C.J. Olmstead, The Law of International Drainage Basins, pp. 505-506; R.L. Olson, The Colorado River Compact, 1st Edition, pp. 20-21.

(3) See Rio Grande Compact 1938 Art. I(c); Republican River Compact 1942 Art. II; Belle Fourche River Compact 1943 Art. II B; Pecos River Compact 1948 Art II(b); Delaware River Basin Compact 1961 Art. 1, Section 1.2(a); Arkansas River Compact 1965 Art. II D.

(4) R.K. Linsley, M.A. Kohler and J.L.R. Paulhus, Applied Hydrology 1st Ed. (1949), p. 244.

(5) See H.A. Smith, The Economic uses of International Rivers (1931), pp. 150-151.

(6) Legal Aspects of the Hydro-Electric Development of Rivers and Lakes of Common Interest U.N. Doc. No. E/ECE/136 E/ECE/EP/98 Rev. 1, p. 26.

Need for allocation of waters of an inter-State river among riparian States.—Division of an inter-State river by the boundaries of several States merely limits the geographic limits of the authority of a given State; but unlike land resources whose distribution among the States is resolved by the very establishment of their boundaries, the water resources of the common river are not subjected to automatic allocation among them by the delineation of their political frontiers. A river is an indivisible physical unit, and the riparian States are in a state of permanent dependence upon each other. The utilisation of the waters of the river within the territory of one State influences the conditions of water utilisation in other States.

There is competition for the common river water among the riparian States, and it is, therefore, necessary to co-ordinate their various uses and needs and to define the limits within which a State can make use of the water to satisfy its own needs. The conflict of interests of the riparian States must be resolved by agreement, judicial decree, legislation or administrative control, so as to secure a fair and just distribution of the water resources among the concerned States.

Constitutional provisions.—India is a Union of States. Under Entry 56 of List I of the Seventh Schedule to the Constitution, Parliament has overriding power of legislation over "regulation of inter-State rivers and river valleys to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest".

In exercise of its powers under Entry 56 of List I, Parliament enacted the River Boards Act, 1956. But no river board has been established under the Act. Apart from enacting the River Boards Act, 1956, Parliament has not exercised its powers under Entry 56 of List I.

Under Entry 17 of List II, the Legislature of a State has exclusive power over water, that is to say, water supplies, irrigation and canals, drainage and embankments, water storage and water power subject to the provisions of Entry 56 of List I. Under article 162 of the Constitution, the executive power of a State extends to the matters with respect to which the Legislature of the State has power to make laws.

Thus, subject to competent legislation by Parliament, a State has plenary legislative and executive powers over all water within its jurisdiction. But the use, control and distribution of the waters of an inter State river and river valley within the boundaries of one State may prejudically affect the interest of another State or States and, if so, a water dispute between two or more States may arise. Article 262 of the Constitution authorises Parliament to pass laws providing for adjudication of disputes relating to waters of inter-State rivers or river valleys. It is in these terms:—

> "262(1) Parliament may by law provide for the adjudication of any dispute or complaint with respect to the use, distribution or control of the waters of, or in, any inter-State river or river valley.
>
> (2) Notwithstanding anything in this constitution, Parliament may by law provide that neither the Supreme Court nor any other court shall exercise jurisdiction in respect of any such dispute or complaint as is referred to in clause (1)".

In the exercise of the power under article 262(1) Parliament has passed the Inter-State water Disputes Act, 1956.

Inter-State Water Disputes Act, 1956.—Section 2(c) of the Act defines a water dispute thus:—

> " 'Water dispute' means any dispute or difference between two or more State Governments with respect to—
>
> (i) the use, distribution or control of the waters of, or in, any inter-State river or river valley; or
>
> (ii) the interpretation of the terms of any agreement relating to the use, distribution or control of such waters or the implementation of such agreement; or
>
> (iii) the levy of any water rate in contravention of the prohibition contained in Section."

Section 3 enables a State Government to make a complaint as to water disputes. It provides—

> "If it appears to the Government of any State that a water dispute with the Government of another State has arisen or is likely to arise by reason of the fact that the interests of the State, or of any of the inhabitants thereof, in the waters of an inter-State river

or river valley have been, or are likely to be. affected prejudicially by:—

(a) any executive action or legislation taken or passed, or proposed to be taken or passed, by the other State; or

(b) the failure of the other State or any authority therein to exercise any of their powers with respect to the use, distribution or control of such waters; or

(c) the failure of the other State to implement the terms of any agreement relating to the use, distribution or control of such waters,

the State Government may, in such form and manner as may be prescribed, request the Central Government to refer the water dispute to a Tribunal for adjudication."

Sections 4 and 5(1) require the Central Government, if it is of opinion that the water dispute cannot be settled by negotiations, to constitute a Water Disputes Tribunal and to refer the dispute to it for adjudication.

Section 5(2) provides that "The Tribunal shall Investigate the matters referred to it and forward to the Central Government a report setting out the facts as found by it and giving its decision on the matters referred to it".

Section 6 provides that "The Central Government shall publish the decision of the Tribunal in the Official Gazette and the decision shall be final and binding on the parties to the dispute and shall be given effect to by them".

Section 11 provides that "Notwithstanding anything contained in any other law, neither the Supreme Court nor any other court shall have or exercise jurisdiction in respect of any water dispute which may be referred to a Tribunal under this Act".

A State represents all its inhabitants and water users within its territory in a complaint filed by or against it under section 3(7). This proposition is not disputed by any party in the present case.

A State may make a complaint under the Act if the interests of the State or of any of its inhabitants in the waters of an inter-State river or river valley have been or are likely to be affected prejudicially by the action or omission of another State with respect to the use, distribution or control of the water. If the complaint is justified, the Tribunal gives suitable reliefs. The decision of the Tribunal overrides all repugnant State legislation and executive action. In this manner, the plenary powers of a State over the waters of the inter-State river and river valley within its jurisdiction are regulated and controlled by the decision of the Tribunal. It may be observed that the Indus Commission(8) held that the plenary powers of a Province under the Government of India Act, 1935, over the waters of an inter-Provincial river within its own boundaries were likewise controlled by a decision given under Sections 130 to 132 of that Act. Thus, the equal right of each State over the waters of the inter-State river and river valley must be respected by all, and none is free to do what it likes with the waters within its boundaries without respecting the interests of others.

Law applicable.—If there is competent legislation by Parliament on the subject of the apportionment of the waters of an inter-State river and river valley, that law binds all the States and there is no room for an inconsistent apportionment. The Tribunal has no power to override the paramount Central Legislation.(9)

(7) In an original proceeding brought before the United States Supreme Court by a State against another State for adjudication of their respective rights in the waters of an inter-State river, the States are deemed to represent all their citizens and water claimants within their respective territories and an adjudication of the States' rights in such a proceeding binds the water claimants in the States as well. Wyoming v. Colorado 286 U S. 494, 506, 509 (1932) ; Wyoming v. Colorado 298 U.S. 573, 575-576 (1936); Nebraska v. Wyoming 295 U.S. 40 (1935); M.C. Hinderlater v. La Plata River and Cherry Creek Ditch Company 304 U.S. 92-82 L. Ed. 1202, 1210; New Jersey v. New York 345 U.S. 369, 372 (1953). See also Report of the Indus (Rau) Commission Vol. I, pp. 39-40.

(8) Report of the Indus (Rau) Commission Vol. I, pp. 21, 32-33, 63, 107.

(9) In Arizona v. California 373 U.S. 546 (1963) at pp. 565, 566, the United States Supreme Court observed "It is true that the court has used the doctrine of equitable apportionment to decide river controversies between States. But in those cases Congress had not made any statutory apportionment. In this case, we have decided that Congress has provided its own method for allocating among the lower Basin States the mainstream water to which they are entitled under the Compact. Where Congress has so exercised its constitutional power over waters, courts have no power to substitute their own notions of an 'equitable apportionment' for the apportionment chosen by Congress."

Sections 2 and 3 of the Inter-State Water Disputes Act, 1956 indicate that, if there is an agreement between the States relating to the use, distribution or control of the waters, that agreement should be implemented. The agreement determines their respective rights and obligations and furnishes the agreed "law" on the subject.(10)

Likewise competent arbitral awards and judicial decrees should be respected.

In the absence of legislation, agreement, award or decree, the Tribunal has to decide the dispute in such a way as will recognize the equal rights of the contending States and at the same time establish justice between them.(11) Equal right does not mean an equal division of the water.(12) It means an equitable apportionment of the benefits of the river, each unit getting a fair share.(13)

Equitable apportionment.—The decisions of the U.S.A. Supreme Court firmly established the doctrine of equitable apportionment of the benefits of an inter-State river. The principle was earlier recognised by the Swiss Federal Tribunal in 1878(14) and it also contains the essence of international law on the matter.(15)

In India also, the right of States in an inter-State river is determined by applying the rule of equitable apportionment, each unit getting a fair share of the water of the common river. The doctrine of riparian rights governs the rights of private parties, but it does not afford a satisfactory basis for settling inter-State water disputes.(16)

Broad concept.—The concept of equitable apportionment does not land itself to precise formulations. Its meaning cannot be written into a code that can be applied to all situations and at all times. The standard of an equitable apportionment requires an adaptation of the formula to the necessities of the particular situation.(17) The effort always is to secure an equitable apportionment without quibbling over formulas.(18)

There is no mechanical formula of equitable apportionment applicable to all rivers. Each river system has its own peculiarities. In arid regions, the principal need may be for irrigation, while in humid regions there may be more need for power plants, municipal water supply, navigation and preservation of fisheries. One river system may be more fully developed than another; in one there may be scarcity of water, while in another the supply may be abundant. In one river system, the States may place emphasis on co-operative approach for optimum development of water resources; in another they may desire nothing more than an apportionment of the water for their separate uses. In one river the water diverted for developing the best hydro-power potential may be wasted to the sea; in another the tailrace water may be profitably used again for irrigation downstream.

In one river system, storage works may predominate; while in another there may be more diversion works and barrages requiring different schemes for allocation of the river water. In one river, there may be reliable measurement of historical discharges at key sites; in another such data may not be available. In one system, the river flow is perennial; in another the flow lasts during the monsoon months only. The apportionment of water resources must take into account the peculiar physical, hydrological, economic, political and legal characteristics of the river system and the territory drained and served thereby and the solution of the dispute must be shaped accordingly.(19)

(10) Report of the Indus (Rau) Commission Vol. I, pp. 10, 31.

(11) Kansas v. Colorado 206 U.S. 46, 98.

(12) Wyoming v. Colorado 259 U.S. 419, 465.

(13) Kansas v. Colorado 206 U.S. 46 118; Colorado v. Kansas 320 U.S. 383, 385.

(14) The Zwillikon Dam case. See H.A. Smith, The Economic uses of International Rivers (1907) pp. 39, 40; W.L. Griffin, The Uses of Waters of International Drainage Basins under Customary International Law, American Journal of International Law, Vol. 53 (1959), p. 66.

(15) H.A. Smith, The Economic uses of International Rivers, p. 51; J.D. Chapman, The International River Basin (1963), p. 23 Helsinki Rules Article IV.

(16) See Report of the Indus (Rau) Commission Vol. I, pp. 10, 13, 33, 36, 41; The Indian Easements Act, 1882, Section 7, Illustrations (h) and (i); Kansas v. Colorado 206 U.S. 46, 87, 105; Connecticut v Massachusetts 282 U.S. 660, 670.

(17) Nebraska v. Wyoming 325 U.S. 589, 627.

(18) New Jersey v. New York 283 U.S. 336, 343.

(19) R.E. Clark Water and Water Rights (1967) Vol. II, p. 427; Legal Aspects of the Hydro-Electric Development of Rivers and Lakes of Common Interest U.N. Doc. No. E/ECE/136 E/ECE/EP/98 Rev. I. pp. 40, 41; H.A. Smith, The Economic Uses of International Rivers (1931), p. 87.

Guidelines.—Equitable apportionment calls for the exercise of informed judgment on a consideration of many variable yet important factors, such as, the hydrological, climatic and physical characteristics of the river basin, the volume of available supply, diversions and return flow, the Statewise drainage area and contribution to the supply, the respective needs of the States, the population dependent on the water supply and the degree of their dependence, alternative means of satisfying the needs, the extent of lawfully established uses and reasonable requirements for future uses in each State, the relative value of different uses, and the avoidance of unnecessary waste of water. The list of relevant factors is illustrative and not exhaustive.(20)

The weight to be given to a relevant factor is a matter of judgment on the pertinent facts of the particular case and no hard and fast rule can be laid down.

The relevant factors emphasised in the 1959 Egyptian Sudanese Treaty were the arable areas easily irrigated in each country, the population of the States, the existing uses and in a less degree the financial contribution of each to the development projects. The State's contribution to the available river flow was not the crucial factor in the apportionment of the Nile waters.(21) In the North Platte river litigation,(22) Colorado was allotted about 3 per cent of the river flow, though it contributed 21 per cent of the flow.

No State has a proprietary interest in a particular volume of water of an inter-State river on the basis of its contribution or irrigable area. Rules of law based on the analogy of private proprietary interests in water do not afford a satisfactory basis for settling inter-State water disputes.(23)

The needs of the riparian States include all their economic and social requirements which cause them to be dependent to a greater or lesser degree on the river water. Varying degrees of dependence on water in arid and humid climates create varying degrees of need.(24) Existing use of a State is important evidence of its needs. Demands for potential uses are capable of indefinite expansion.(25) Equitable apportionment can take into account only such requirements for prospective uses as are reasonable having regard to the available supply and the needs of the other States.(26)

Scarcity areas are heavily dependent on river water for irrigation and the needs of such areas should receive special consideration.

If all the uses cannot be reconciled, it becomes necessary to ascertain which uses will prevail.(27) In regulating the conflicts of different interests, an attempt is made to appraise and rank them in order of value, laying down that in the given situation on interest is to be preferred to another.(28)

An allocation of water may be made so as to maximise economic gains,(29) but an established use may have to be protected, though the same amount of water may produce more in other sections of the river.(30)

Needless waste of water should be prevented and efficient utilisation encouraged.(31)

(20) Some guidelines are given in Helsinki Rules Article V(2); Nebraska v. Wyoming 325 U.S. 589, 618; Report of Michael J. Doherty, Special Master in the same case p. 109; W.L. Griffin, The Uses of Waters of International Drainage Basins under Customary International Law, The American Journal of International Law Vol. 53 (1959) pp. 50, 77-78.

(21) Rolet Chi-Shih Chen, The Non-Navigational uses of International Rivers (1965), p. 156.

(22) Nebraska v. Wyoming 325 U.S. 589, 592 f.n. 621, 665.

(23) Report of the Joint Committee on Indian Constitutional Reforms 1934 Vol. I Part I para 225.

(24) A.H. Garretson and others, The Law of International Drainage Basins (1967), pp. 44, 55-56.

(25) J. Herschleifer, J.C. De Haven J.W. Milliman, Water Supply (Economics, Technology and Policy), pp. 35-36.

(26) W.L. Griffin, The Uses of Waters of International Drainage Basins under Customary International Law, The American Journal of International Law Vol. 53 (1959) p. 50, 78 (possible future development in the light of what is a reasonable use of the water by each riparian).

(27) A.H. Garretson and others, The Law of International Drainage Basins (1967), p. 47.

(28) H.A. Smith, The Economic Uses of International Rivers (1931), p. 139.

(29) Administrative Reforms Commission, Report of the Study Team on Centre-State Relationships (1967) Vol. I, pp. 228-229; Joseph L. Sax, Water Law Planning and Policy (1968), p. 86; R.E. Clark, Water and Water Rights (1967) Vol. II, p. 347.

(30) Nebraska v. Wyoming 325 U.S. 589, 621.

(31) Wyoming v. Colorado 259 U.S. 419, 484; Report of the Indus (Rau) Commission Vol. I, pp. 52-54; C.B. Bourne, The right to utilize Water of International Rivers, The Canadian Year Book of International Law, 1965 Vol. III, pp. 214-218; A.H. Garretson and others, The Law of International Drainage Basins (1967), p. 46.

We shall discuss elsewhere more elaborately the principles of equitable apportionment relating to existing uses, preferential uses and diversion of river water to another watershed.

Meanwhile, we must point out certain peculiarities of U.S.A. Supreme Court decisions and of international law and the caution required in applying them for resolving inter-State water controversies in India. We shall also notice the law and practice in British India regarding inter-Provincial water disputes, and the role of planning of water resources development in India after the Constitution came into force.

U.S.A. Supreme Court decisions: The great merit of the U.S.A. Supreme Court decisions is that they enunciate the broad principles of equitable apportionment. However, in the concrete application of the principle, those decisions are guided by the peculiar constitutional framework and domestic water law of U.S.A., which in many respects are different from those of India. A few points of difference may be noted.

The American States were originally independent sovereign units. Upon the Congress consenting, an inter-State compact operates to the same effect as a treaty between sovereign States(32) and becomes a law of the Union.(33) In India, the States were not originally independent sovereign units,(34) and an inter-State agreement is not a treaty between sovereign States, nor does it become a law of the Union.

In U.S.A., the territorial boundaries of the States are permanent and sacrosanct. In India, the areas and boundaries of the States can be altered by Parliament. New States have been created and individual States have been extinguished by Parliamentary legislation.

The U.S.A. Supreme Court cannot issue declaratory decrees.(35) An international tribunal is not subject to this limitation,(36) nor is the power of an Indian Tribunal so fettered by the Inter-State Water Disputes Act. If declaratory relief cannot be granted, an adjudication of an inter-State water dispute is an inadequate tool for purposes of planning.(37)

Moreover, the local water laws, the financial structure and the national planning in India are in many ways different from those of U.S.A.(38)

For all these reasons, the U.S.A. Supreme Court decisions cannot be blindly applied to Indian conditions, nor are they binding authorities in India. They furnish guidelines on broad general principles of equity and are useful examples of solutions of conflicting claims of States in inter-State water controversies. The decisions of other foreign federal courts stand on the same footing.

International Law: Historically, sovereign States were primarily concerned with non-consumptive uses of water of international river such as navigation and fishing. Competing claims of riparian States to consumptive uses of water for irrigation and other purposes and rules of international law, if any, regulating such uses are of comparatively recent origin. Opinions of jurists and associations of jurists on international law do not always distinguish the law as it really is from the law as they think it should be.(39) Moreover, there is a clear distinction between international law and national law governing States bound by a Federation.(40)

The Swiss Federal Tribunal rightly observed(41) "Within a federal state and subject to its legislation, the situation is different from that between fully sovereign states. Not only is the community between riparian States—recognised in international law—clo-

(32) Rhode Island, v Massachusetts 12 Pet, 657, 725; Constitution of the United States of America revised by Prof. Corwin (1952), p. 370.

(33) Missouri v. Illinois 200 U.S. 496, 519; Constitution of the United States of America, Article VI.

(34) State of West Bengal v. Union of India (1964) 1 S.C.R. 371, 396.

(35) Arizona v. California 283 U.S. 423, 464.

(36) A.H. Garretson and others, The law of International Drainage Basins (1967), p. 59.

(37) R.E. Clark, Water and Water Rights (1967) Vol. II, p. 363.

(38) Administrative Reforms Commission, Report of the Study Team on Centre-State Relationships (1967) Vol. I, p. 125.

(39) See F. J. Berberk, Rivers in International Law (1959), pp. 40, 259; Rolet Chi-Shi Chen, The non Navigational uses of International Rivers (1965) pp. 183, 210.

(40) See Judgement of the German Federal Tribunal in Donauversinkung case cited in F. J. Berber, Rivers in International Law (1959), pp. 175-176.

(41) Fribourg v. Fedreal Council 78 T.F.I. p. 37 cited in W.J. Rise, Law among States in Federacy pp. 3-17, 3-18.

ser between federated states, but above all they have a positive law which binds them all and a law dispenser that stands above them all." Subject to these reservations, decisions of courts and tribunals and opinion of jurists on international law may be consulted if they give sensible suggestions for resolving inter-State water controversies.

Law and Practice in British India : British India was divided into Provinces. Till 1921, irrigation works were subject to the unitary control of the Central P.W.D. Since 1921, under the Government of India Act, 1915, as amended by the Government of India Act, 1919, "Water supplies" became a provincial subject, but even then the Government of India could decide inter-Provincial water disputes. The report of the Joint Committee on Indian Constitutional Reform (1934)([42]) observed:

> "Water supplies" is now a Provincial Subject for legislation and administration, but the Central Legislature may also legislate upon it "with regard to matters of inter-provincial concern or affecting the relations of a Province with any other territory". Its administration in a Province is reserved to the Governor in Council, and is, therefore, under the ultimate control of the Secretary of State, with whom the final decision rests when claims or disputes arise between one Provincial Government and another, or between a Province and a State."

The Government of India used to decide inter-Provincial water disputes on administrative considerations. In letter No.IR45 dated the 18th March, 1935 from the Secretary to the Government of India, Department of Industries and Labour (Public Works Branch), to the Government of United Provinces, Public Works Department, Irrigation Branch,([43]) the Government of India stated: "the decisions of the Government of India in inter-Provincial disputes relating to the distribution of water are based upon administrative, and not legal, considerations. Each case must therefore be taken separately and no decision can operate as a general precedent". Consequently these decisions are not of much help in determining the fair share of the units of a Federation in the waters of an inter-State river.

Before Independence, the Government of India as the paramount power settled water disputes between a Province and an Indian State or between two or more Indian States.([44]) Even under the Government of India Act, 1935, paramountcy control continued with respect to unfederated States.([45]) Though the Government of India in the exercise of its powers of paramountcy control professed to apply rules of international law and the precept of the greatest good to the greatest number irrespective of political boundaries, the actual settlement of the disputes used to be made on political considerations.

Under the Government of India Act, 1935, as from the 1st April, 1937, water became an exclusive provincial subject and specific provision was made in sections 130 to 134 of the Act for decision of water disputes. The Report of the Indus Commission appointed under section 131 of the Act contains a valuable exposition of the principles of equitable apportionment of the benefits of a common river with particular reference to Indian conditions.

Planning of water resources development in India under the Constitution : As water including irrigation and water power is a State subject (Entry 17, List II), it is the State Governments which investigate and formulate schemes for development of water resources and ultimately accord administrative approval to them. However, as economic and social planning is a Concurrent subject (Entry 20, List III), the Union Government as well as the State Governments prepare five year and annual plans for developing the country's resources. The Union Government has the discretionary power under article 282 of the Constitution to make grants for any public purpose including grants to State Governments for financing the State plans. For obtaining these grants, the State Governments are required to obtain clearance of their projects from the Planning Commission. When a

(42) Report of the Joint Committee on Indian Constitutional Reforms Vol. I Part I page 124 para 224.

(43) File No. I.R. 45(1) of 1935 Serial No. 6 Government of India, Department of Industries and Labour (Public Works Branch) Civil Works—Irrigation, (Subject—Rejection of the claim of the Government of the United Provinces for compensation on account of the impending decrease in the supply of water from the River Jumna to the Agra Canal as a result of the scheme for the improvement of water supply arrangements in Delhi.

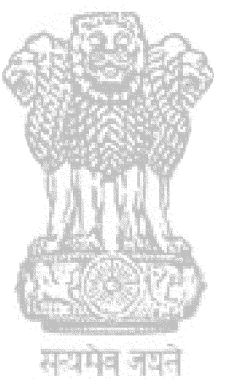
(44) White Paper on Indian States pp. 9, 151 (Lord Reading's letter to the Nizam of Hyderabad, dated the 27th March, 1926); History of the Dispute regarding the Ruparel river with the Alwar State compiled by the Bharatpur State Council from State Records (1904), pp. 12-13.

(45) Section 285 of the Government of India Act 1935, N. Rajagopala Aiyangar's Commentary on the Government of India Act 1935, p. 169.

scheme has been fully investigated and a project report is prepared, the report is submitted by the State Government to the Central Water and Power Commission. After scrutiny of the technical and economic feasibility of the project, the latter makes a report to the Technical Advisory Committee on Irrigation, Flood Control and Power Projects of the Government of India. This Committee advises the Planning Commission and the Ministry of Irrigation and Power on the suitability of the scheme for inclusion in the Plan. The schemes are included in the Plan by the Planning Commission, keeping in view the country's resources and the best method for their effective and balanced utilisation.

In view of the dependence of the States on Central grants, the Union Government plays a dominant role in planning the development of water resources and may withhold clearance of projects on an inter-State river until a consensus is reached between the concerned States regarding distribution of the waters of the inter-State river between them. However, the Union Government and the Planning Commission have no statutory authority to allocate the water resources among the States or to fix the order of priorities for their projects. If a water dispute arises and the same cannot be settled by negotiations, a reference has to be made to a Tribunal appointed under the Inter-States Water Disputes Act, 1956, for adjudication of the dispute.

After a water dispute has arisen, the Planning Commission may withhold clearance of new projects on an inter-State river, until the river water is apportioned by the Tribunal between the States and the Planning Commission is satisfied that the State concerned is entitled to appropriate the water required for its new projects. In view of the dependence of the States on Central grants, it becomes absolutely necessary for them to obtain an adjudication of the dispute and a declaration of their respective rights in the available supply, so that they may obtain clearance of their projects from the Planning Commission.



CHAPTER XII

Protection of existing uses

Protection of existing uses; Issue II (3) *Pleadings*: The supplies of the Krishna river system are sufficient to meet the requirements of all the existing uses, but they are not sufficient to meet the requirements of both existing and contemplated uses. The question arises whether, in fixing the equitable shares of the parties, claims for existing uses should be preferred to claims for contemplated uses.

Andhra Pradesh having appropriated a large portion of the supplies of the Krishna waters is vitaliy interested in the preservation of its existing uses. Andhra Pradesh pleaded that, in case of de novo allocation, the committed utilisations of the Krishna waters should be divided into three categories, (1) committed as in 1951, (2) committed between 1951 and September 1960 and (3) committed after September 1960. Committed utilisation means utilisation by schemes in operation as well as by schemes in the process of implementation and execution. The case of Andhra Pradesh is that all utilisations committed up to 1951 are sacrosanct and are entitled to the fullest protection, and should get full and timely supply on a daily basis as a first priority. Utilisations committed between 1951 and September, 1960 are also entitled to full protection and should get full and timely supply on a weekly basis with second priority to new schemes.

After allowing the committed utilisations up to September 1960, the balance water only should be considered for de novo allocations. Clearance of projects by the Central Government after 1960 in spite of objection or without knowledge of the concerned States ought not to be taken into account by the Tribunal.

Maharashtra and Mysore disputed the classification of committed utilisations into three categories and the claim of Andhra Pradesh for protection of its projects.(1)

Accordingly, the following issue was raised:—

Issue II(3): What projects and works in operation or under construction, if any, should be protected and/or permitted? If so, to what extent?

Meaning of protection: The term "protection" as used in the issues, agreed statements and this judgment must be understood to mean that, in allocating the water, certain existing uses for which protection is claimed and granted should be preferred to contemplated uses. In fixing the equitable shares of the States, the claims of such existing uses should be allowed before claims for future uses are taken up for consideration. It is not intended that the existing uses must continue or that they should not be changed in future.

All projects whether protected or not will get such supply as will be available to them under the final scheme of allocation. It is not intended that simply because a project is protected it will get full and timely supply on a daily or weekly basis in priority to any other project.

Law on the subject of priority of existing uses over contemplated uses: On the question whether existing uses occupy a preferred position over contemplated uses in equitable apportionment, we shall briefly notice (1) Indian law and practice, (2) law in U.S.A. and (3) international law.

Indus (Rau) Commission: The Indus (Rau) Commission laid down the following general principles for equitable distribution of the waters of inter-Provincial rivers(2):—

> "In the general interests of the entire community inhabiting dry, arid territories, priority may usually have to be given for an earlier irrigation project over a later one: 'priority of appropriation gives superiority of right' (Wyoming v. Colorado 259 U.S. 419, 459, 470).
>
> For purposes of priority, the date of the project is not the date when survey is first commenced, but the date when the project reaches finality and there is a fixed and definite purpose to take it up and carry it

(1) APK I pp. 49-55, 123-125, 129-132, 134-135; MRK III pp. 65-72; MYK III pp. 34-40.

(2) Report of the Indus (Rau) Commission Vol. I, p. 11.

through, (Wyoming v. Colorado 259 U.S. 419, 494, 495 Connecticut v. Massachussets 282 U.S. 660, 667, 673)".

Earlier Indian Practice.—In the matter of the dispute regarding the Ruparel River in 1843, the Government of India pronounced that rights of possession regarding existing appropriations should be respected and preserved(3)

In the dispute over the waters of the Sutlej in 1918, the concerned States and Provinces agreed that established rights should be fully safeguarded or compensated for.(4)

Law in U.S.A.—For the settlers in the dry and arid tracts of the Western States, priority of appropriations in time assumed a greater significance than in humid areas and the law of prior appropriation prevailed in those States. Under that law, the one who first appropriated water and put it to beneficial use thereby acquired a vested right to continue to divert and use that quantity of water against all claimants junior to him in point of time. "First in time first in right" is the short-hand expression of this legal principle.(5)

In Wyoming v Colorado,(6) the U.S.A. Supreme Court applied the doctrine of priority of appropriation in equitable allocation of waters of inter-State streams. As the available supply of the Laramie river was not sufficient to satisfy Wyoming's prior appropriations dependent thereon and the proposed Colorado appropriations, the Court determined Wyoming's share of the water on lumping up the reasonable requirements of Wyoming's prior appropriations and allocated the remaining water to Colorado. The Court held that a project was entitled to priority from the date when the actual work of construction was begun, and not from a date anterior to the time when there was a fixed and definite purpose to take it up and carry it through.

While priority of appropriation is the guiding rule, it is not conclusive in equitable allocation. In Nebraska v. Wyoming(7) the junior uses of Colorado were allowed to prevail over the senior uses of Nebraska having regard to Colorado's countervailing equities and established economy based on existing uses of the water.

The American doctrine of prior appropriation is not applicable in India as between individual riparian owners even in a part of the country where the soil is dry, rocky and parched.(8) However, the domestic water law is not necessarily of controlling weight in an inter-State water controversy. The Indus (Rau) Commission has held that in equitable allocation of the waters of inter-Provincial rivers in India, priority of appropriation might give superiority of right.

International Law.—Existing use is one of the factors which should be taken into account in determining what is a just and equitable sharing of the benefits of an international river basin.(9)

In determining what is equitable utilisation where existing and contemplated uses are in conflict, while other factors must be considered and weighed, the most important single factor is the preferred position of the existing use; thus, an existing use which is beneficial and not wasteful will ordinarily prevail over a contemplated use. But a contemplated conflicting use will nevertheless prevail over an existing use if the former offers benefits of such magnitude as is sufficient to outweigh the injury to the existing use.(10)

Article VIII of the Helsinki Rules of the International Law Association on the uses of international streams offers the following guidelines :—

1. An existing reasonable use may continue in operation unless the factors jutifying its continuance are outweighed by other factors leading to the conclusion that it be modified or terminated so as to accommodate a competing incompatible use.

2. (a) A use that is in fact operational is deemed to have been an existing use from the time of the initiation of construction directly

(3) History of the Dispute regarding Ruparel river with the Alwar State compiled by the Bharatpur State Council from State records 1904, p. 12.

(4) Report of the Indus (Anderson) Committee Vol. II, p. 60.

(5) Arizona v. California 373 U.S. 543, 555 (1963).

(6) 259 U.S. 419, 469-471, 489-496.

(7) 325 U.S. pp.585, 618, 621-622.

(8) Bel Bhadar Pershad Singh v. Sheik, Barkat Ali, 11, CWN,85.

(9) J. D. Chapman, The International River 1963, pp. 22-23.

(10) A. H. Garretson and others. The Law of International Drainage Basins (1967), pp. 57-58.

related to the use or, where such construction is not required, the undertaking of comparable acts of actual implementation.

(b) Such a use continues to be an existing use until such time as it is discontinued with the intention that it be abandoned.

3. A use will not be deemed an existing use if at the time of becoming operational it is incompatible with an already existing reasonable use.

J. G. Laylin and B. M. Clagett(11) observe that in case of competition between new or proposed beneficial uses and old lawfully established beneficial uses they know of no instance in which a State under the principle of equitable apportionment has been required to relinquish, without full replacement from other sources, a lawfully established beneficial use in order to enable a coriparian State to develop a new use or uses of the same kind. To be lawfully established, a beneficial use "must not have been established over the timely protest of a coriparian State which offered to resolve by peaceful means including, if necessary, arbitration or adjudication the question whether the use comes within the equitable share of the State proposing it."(12)

Existing uses on the Krishna River System.—Some uses of the Krishna waters were lawfully established before 1951. Since 1951, a number of projects were cleared by the Planning Commission. No objection was raised by the States to the implementation of the projects sanctioned by the Planning Commission until September, 1960. An inter-State conference was held on the 26th and 27th September, 1960 to discuss the re-allocation of the Krishna waters in view of the reorganisation of States. At the conference, Maharashtra and Mysore insisted on a de novo allocation of the Krishna waters and demanded that until such allocation, the clearance of new projects should be withheld. The protest against clearance of new projects was followed by applications by Mysore in January, 1962 and by Maharashtra in June, 1963 for reference of the dispute to the Tribunal for adjudication.

We find that all commitments made up to September, 1960 were made without any protest from any coriparian State under the bona fide belief that the committed utilisations will be allowed to continue. At the meeting of September, 1960 Maharashtra was prepared to honour all physical commitments up to September, 1960(13) Before us, both Maharashtra and Mysore wanted protection for all their projects committed up to September, 1960.

We also find that all commitments made after September, 1960 were set up over the protest of coriparian States.

Maharashtra and Mysore do not want protection for any projects committed after September, 1960 unless the project is protected by agreement or concession of the parties. Even Andhra Pradesh in its pleadings did not claim any protection for such projects. In the agreed statement filed on the 7th May, 1971, all parties conceded that a few projects committed after September, 1960 should be protected.

Priority of existing uses on the Krishna River System.—We are satisfied that prima facie the reasonable requirements of all projects in operation or under construction as on September, 1960 should be preferred to contemplated uses and should be protected.

Any utilisation made after September, 1960 by such projects in excess of the utilisation envisaged in September, 1960 should be regarded as a new appropriation made after September, 1960.

Prima facie except by special agreement or concession of the parties a project committed after September, 1960 is not entitled to any priority over contemplated uses.

Agreed statement dated the 7th May, 1971.—On the 7th May, 1971(14) the parties filed an agreed statement that the following projects and the quan-

(11) J. G. Laylin and B. M. Clagett, The allocation of waters of International streams in Economics and Public policy in Water Resource Development edited by Smith and Castle 1964 Ed. p. 428.

(12) Ibid pp. 428, 445 f. n. (14)
see also Report of the Fifty Second Conference International Law Association, Helsinki 1966 p. 454.

(13) MRK II p. 215.

(14) MRDK VIII pp. 61-63.

tum of their utilisations and evaporation losses as mentioned below should be protected :—

Sl No.	Name of the Project	Name of the State in which the Project is situated	Agreed			Remarks
			Quantum of utilisation T.M.C.	Evaporation losses in T.M.C.	Total T.M.C.	
1	2	3	4	5	6	7
	K-1					
1.	Krishna canal ex-Khodshi weir	Maharashtra	2.70	Nil	2.7	
2.	Koyana Hydro Electric Stages I & II	-do-	67.50	7.30	74.8	
3.	Warna	-do-	40.55	7.15	47.7	
4.	Tulshi	-do-	2.31	0.28	2.6	
5.	Radhanagari	-do-	10.00	1.00	11.0	
	K-2					
6.	Upper Krishna State I	Mysore	98.50	4.50	103.0	
	K-3					
7.	Ghataprabha Stages I & II	-do-	34.8	1.75	36.6	
	K-4					
8.	Malaprabha	-do-	31.1	6.10	37.2	
	K-5					
9.	(a) Tata Hydel Power Scheme (b) Andhra Valley Power Scheme (c) Tata Power Scheme (Mulshi)	Maharashtra	42.60	2.40	45.0	
10.	Mutha System Ex-Khadakwasla	-do-	22.4	1.10	23.5	
11.	Ghod Dam	-do-	8.40	2.00	10.4	
12.	Kukadi	-do-	18.00	2.07	20.1	
13.	Visapur Tank	-do-	0.4	0.10	0.5	
14.	Bhima	-do-	70.00	20.20	90.2	
15.	Nira Canal System	-do-	32.30	2.30	34.6	
16.	Vir Dam	-do-	14.40	0.30	14.7	
17.	Mhaswad	-do-	1.60	0.60	2.2	
18.	Ashti Tank	-do-	0.30	0.40	0.7	
19.	Mangi Tank	-do-	0.90	0.20	1.1	
20.	Ekruk Tank	-do-	0.80	1.00	1.8	
21.	Khasapur Tank	-do-	1.00	0.30	1.3	
22.	Sholapur City Water Supply Scheme	-do-	0.30	Nil	0.3	Total withdrawal 1.6 T.M.C. only 20 percent is considered as consumptive use.
	K-6					
23.	Kurnoor	-do-	1.40	0.10	1.5	
24.	Chandrampalli	Mysore	1.72	0.15	1.9	
25.	Kotepallivagu	Andhra Pradesh	1.70	0.26	2.0	

1	2	3	4	5	6	7
	K-7					
26.	Koilsagar	Andhra Pradesh	3.40	0.50	3.9	
27.	Okachettivagu	-do-	1.67	0.25	1.9	
28.	Dindi	do-	3.01	0.70	3.7	Andhra Pradesh reserves the right to claim the difference of 1.6 T.M.C. as water required for the project dehors protected uses.
29.	Guntur Channel	-do-	4.00	Nil	4.0	
30.	Vaikuntapuram Pumping Scheme	-do-	2.60	Nil	2.6	
	K-8					
31.	Bhadra Anicut	Mysore	3.10	Nil	3.1	
32.	Tunga Anicut	-do-	11.50	Nil	11.5	
33.	Ambligola	-do-	1.30	0.10	1.4	
34.	Anjanapur Reservoir	-do-	2.20	0.33	2.5	
35.	Dharama Canal System and Dharma Project	-do-	2.00	0.20	2.2	
36.	Tungabhadra Right Bank Low Level Canal	-do-	19.00	3.5	22.5	
37.	Tungabhadra Right Bank Low Level Canal	Andhra Pradesh	24.00	5.50	29.5	
38.	Tungabhadra Right Bank High Level Canal (Stages I & II)	Mysore	17.50	Nil	17.5	
39.	Tungabhadra Right Bank High Level Canal (Stages I & II)	Andhra Pradesh	32.50	Nil	32.5	
40.	Hagari Bommanahalli	Mysore	1.5	0.5	2.0	
41.	Gajuladinne	Andhra Pradesh	1.8	0.2	2.0	
	K-9					
42.	Bhairavanitippa	-do-	4.10	0.80	4.9	
43.	Vanivilas Sagar	Mysore	5.90	2.30	8.2	
	K-10					
44.	Musi	Andhra Pradesh	8.41	1.00	9.4	
45.	Water Supply to twin city Hyderabad & Secundrabad	-do-	0.82	3.1	3.9	Evaporation=3.1 T.M.C. 20 percent of water supply use=0.52 T.M.C. Sewage Farm=0.30 T.M.C. Total : 3.92 T.M.C

1	2	3	4	5	6	7
	K-11					
46.	Palair	Andhra Pradesh	3.27	0.68	4.0	
	K-12					
47.	Pakhal Lake	-do-	1.78	0.85	2.6	
48.	Muniyeru	-do-	3.29	Nil	3.3	
49.	Lankasagar	-do-	0.80	0.20	1.0	
50.	Wyra	-do-	2.81	0.88	3.7	

Projects in respect of which there is a dispute whether they should be protected and, if so, to what extent.—On the 7th May, 1971 the parties filed an agreed list of projects in respect of which there was a dispute as to whether they should be protected and, if so, what quantum of utilisations and evaporation losses should be protected(15)

The list is as follows :—

Sl. No.	Name of Project	Name of the State in which the project is situated	Quantum of utilisation			Evaporation losses			Total gross (i.e. including evaporation losses) Utilisation			Protected uses including evaporation losses	Remarks
			a	b	c	a	b	c	a	b	c		
			Maharashtra	Mysore	A.P.	Maharashtra	Mysore	A.P.	Maharashtra	Mysore	A.P.		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	K-1												
						(All figures are in T.M.C.)							
1.	Krishna .	Maharashtra	33.6	33.0	33.0	3.3	3.3	3.3	36.9	36.3	36.3	*	*Subject to argument on regeneration.
	K-3												
2.	Gokak Canal	Mysore	1.40	1.40	Nil	Nil	Nil	Nil	1.4	1.4	Nil		
	K-7												
3.	Sarisailam .	Andhra Pradesh	Nil	Nil	Nil			33.00			33.0		
4.	Nagarjuna sagar .	-do-	149.5	149.5	264.0	14.0	14.0	17.0	163.5	163.5	281.0		
5.	Krishna Delta	-do-	161.0	161.0	214.0	Nil	Nil	4.0	161.0	161.0	218.0		
	K-8												
6.	Bhadra Reservoir . .	Mysore	56.8	56.8	46.6	4.9	4.9	4.9	61.7	61.7	51.5		
7.	Tungabhadra Low Level Left Bank Canal .	-do-	92.3	92.3	56.0	9.0	9.0	9.0	101.3	101.3	65.0		
8.	Vijayanagar . Channels .	-do-	Nil	13.7	Nil	Nil	Nil	Nil	Nil	13.7	Nil		
9.	Rajolibunda Diversion .	-do-	0.80	0.80	1.20	Nil	Nil	Nil	0.8	0.8	1.20*	.	*Subject to argument on regeneration.
10.	-do- .	Andhra Pradesh	10.00	10.00	15.90	Nil	Nil	Nil	10.0	10.0	15.90		
11.	Kurnool Cuddapah Canal	-do-	20.0	19.0	69.4	Nil	Nil	Nil	20.0	19.0	69.4		

(15) MRDK VIII pp. 64-65.

We now proceed to discuss the projects mentioned in the last statement as also minor irrigation in respect of which there is a dispute as to the extent of protection.

(1) *Krishna Project.*—The Krishna Project is an irrigation project with storages at Dhom and Borkhal on the Krishna river and at Kanher on the Venna river, and canals for irrigation in Satara and Sangli Districts of Maharashtra. The command area of the project falls within the rain shadow region of the Bombay Deccan. The project is under construction.

On the 25th June, 1973, all the parties made the following statement :—

> "All parties are agreed that the annual utilisation of 33.00 T.M.C. and the evaporation loss of 3.3 T.M.C. under the Krishna Project of Maharashtra should be protected."

In allocating the waters of the river Krishna, the annual utilisation of 33.00 T.M.C. and evaporation loss of 3.3 T.M.C. under the Krishna Project of Maharashtra should be preferred to contemplated uses.

(2) *Gokak Canal.*—Mysore claims an allowance of 1.4 T.M.C. of water for the Gokak canal. Andhra Pradesh disputes the claim. (16)

The Gokak canal is in operation for over 84 years.(17) Originally, the canal took off from the Dhupdal Weir on the Ghataprabha and there was an average annual diversion of 1.4 T.M.C. of water for its ayacut. The Kokak canal now takes off from the Ghataprabha Left Bank Canal.

According to Mysore, the index map of the Hidkal Dam Project Stage I Report (18) shows that the area under the Gokak canal is not included in the command of the Ghataprabha Left Bank Canal. But the Krishna Godavari Commission stated(19) that ayacut under the Gokak canal was merged with the Ghataprabha Left Bank Canal in 1951.

In August 1959, the Chief Engineer, P. W. D. Irrigation Project, Mysore stated : "The irrigable area under the Gokak Canal taken from the Dhupdal Weir is included in the irrigable area of the Left Bank Canal of the Ghataprabha Project first stage 0 to 44 miles and the water requirements for the Ghataprabha Left Bank Canal have been calculated taking this area under the Gokak Canal and also the discharges available in the Dhupdal Weir throughout the year.(20)

The annual utilisation of 34.8 T.M.C. under Ghataprabha Project Stages I and II has been protected. No separate provision for the Gokak Canal is necessary as its water requirement will be met from the water provided for the Ghataprabha Left Bank Canal.

The list of sanctioned projects prepared by the Govt. of India in June 1967(21) stated that the sanctioned diversion under the Kokak Canal was 1.4 T.M.C. and mentioned the diversion under the Ghataprabha Project separately. This statement overlooks the fact that the ayacut under the Gokak Canal is now merged in the Ghataprabha Left Bank Canal and that no separate provision for the Gokak Canal is necessary.

(3) *Srisailam Hydro-electric Project* :—

Dispute.—Andhra Pradesh claims protection for the annual evaporation loss of 33 T.M.C. of water under the Srisailam Hydro-electric Project. Maharashtra and Mysore contend that the project is not entitled to any protection.

Project.—The Srisailam Hydro-electric Project comprises a high dam across the Krishna river and a power house at the toe of the dam. The Power house will have 4 generating units of 110 MW each with a provision for adding 3 such units at a later stage. On the basis of the ultimate release of 180 T.M.C. of water annually, the power potential at Srisailam will be of the order of 134 MW at 100 per cent load factor or 224 MW at 60 per cent load factor. The Srisailam Project being a hydro-electric project for generating power without diverting water to another watershed does not involve consumptive use of water except for evaporation loss. (22) The area of the

(16) MRDK VIII p. 64.
(17) MYPK X p. 3 (constructed in 1883), KGCR Ann. VIII p. 107 (in operation from 1889).
(18) MYPK XII, Index Map.
(19) KGCR Ann. VIII pp. 107, 112, 133.
(20) MYDK XII pp. 94, 96.
(21) MYDK I p. 216; MRDK II p. 119.
(22) MYDK II p. 350.

water spread at full reservoir level 885 will be 6,622 million sq. ft. The annual evaporation loss will be 33 T.M.C. reservoir will provide valuable carryover storage.

In November, 1959, the Andhra Pradesh Government sent the project report to the Central Water and Power Commission for approval. On June 7, 1963, the Planning Commission agreed to the commencement of preliminary works. Soon thereafter, the project was inaugurated. On the 26th March, 1964, the Planning Commission sanctioned the project estimated to cost Rs. 45.75 crores. On the 29th August, 1964, the Andhra Pradesh Government granted administrative sanction to the project. Construction of the Project is in progress. Rupees 34.74 crores were spent on the Project upto January 1971.

Objection.—On the 17th May, 1960, the Mysore Government objected to the clearance of the Srisailam Project until the question of allocation of the Krishna waters was finally settled. On the 3rd October, 1960, the Maharashtra Government also lodged a similar protest with the Government of India. In January 1962, the Mysore Government resquested the Government of India to refer the dispute to a Tribunal for adjudication. In June 1963, the Maharashtra Government made a similar request to the Government of India. In spite of these objections, the project was cleared by the Planning Commission in 1964.

The project was taken in hand by the Andhra Pradesh Government after September 1960 in spite of the timely protests of the coriparian States. On a consideration of all relevant factors, we are unable to give special protection to the project.

Conclusion.—The annual evaporation loss of 33 T.M.C. under the Srisailam Hydro-electric Project is not entitled to any priority over contemplated uses. Whether any water should be allowed for this project on other grounds will be considered elsewhere.

(4) *Nagarjunasagar Project* :—

Dispute.—Andhra Pradesh claims protection for the annual utilisation of 264 T.M.C. and evaporation loss of 17 T.M.C. under the Nagarjunasagar Project. Maharashtra and Mysore contend that the protection should be limited to annual utilisation of 149.5 T.M.C. and evaporation loss of 14 T.M.C. only.(23)

Project.—The Nagarjunasagar Project comprises a gravity dam in the gorge portion and earth dam on flanks across the Krishna river near Nandikonda village in Andhra Pradesh and two canals on the right and left sides.

Scope of the project.—The project is based on the joint report prepared by Andhra and Hyderabad States in 1954. The joint report(24) indicated that the project was capable of being executed in two phases and that the dam would be up to F.R.L. 525 in the first phase.

The irrigation benefits in the first phase shown at page 82 of the Report were :—

1	Lakh acres 2
Krishna Delta first crop	1.5
Right Bank canal first crop	9.7
Left Bank canal first crop	6.7
Left Bank canal second crop	1.2
TOTAL	19.1

In the working table for the first phase at page 89 of the report, no provision of water was made for second crop irrigation(25) The irrigation benefits shown at page 89 were :—

1	Lakh acres 2
Krishna Delta first crop (new beneficies existing 10.5 lakh acres)	1.5
Right Bank and Left Bank Canals	18.5
TOTAL	20.0

(23) MRDK VIII p. 64.

(24) APPK I pp. 82, 89.

(25) Report of the COPP Irrigation and Power Team on Nagarjunasagar, 1961, p. 2.

The irrigation benefits in the first phase shown in the revised estimate of October 1956 for Rs. 91.12 crores were(26) :—

	Lakh acres
1	2
Krishna Delta first crop (extra)	1.50
Krishna Delta second crop	1.50
Right Bank canal first crop	9.70
Left Bank canal first crop	6.70
Left Bank canal second crop	1.20
TOTAL	20.60

The COPP Team on Nagarjunasagar found that only two-thirds of the first crop irrigation on Nagarjunasagar canals envisaged in the first phase could be done with F.R.L. 525. The Team recommended the completion of the masonry dam to the final height of F.R.L. 590, keeping the crest at 546 in the first phase and leaving the installation of the gates in the second phase. They found that with crest at 546, the first crop irrigation of 16.4 lakh acres in the Nagarjunasagar canals and 1.5 lakh acres of first crop and 1.25 lakh acres of second crop in the Delta could be done fully.(27)

On the 22nd September, 1960, the Government of India approved of the estimate of October 1956 as revised from time to time with a slight modification.(28) The sanctioned project provided for irrigation benefits as shown in the revised estimate of October 1956. The note annexed to the letter of the Planning Commission dated the 13th June, 1969, stated(29):

> "The sanctioned project provided for irrigation on 17.90 lakh acres of 1st crop (16.4 lakh acres under Nagarjunasagar Canals and 1.5 lakh acres in Delta) and 2.70 lakh acres of 2nd crop (1.2 lakh acres on L.B.C. and 1.5 lakh acres in Delta)."

The cost of the project increased to Rs. 139.53 crores in the estimate of 1962 and Rs. 163.54 crores in the estimate of 1969. The estimates incorporated the changes recommended by the COPP Team including the raising of the full reservoir level to R.L. 546. On the 13th June, 1969, the Government of India approved of the revised estimate of cost amounting to Rs. 163.54 crores. The revised project provides for irrigation of 11.74 lakh acres on the Right Bank Canal and 8.80 lakh acres on the Left Bank Canal.(30)

Construction with the approval of the Planning Commission and the Government of India.—The joint report of 1954 was prepared in pursuance of the recommendations of the Khosla Committee and the decision taken by the Planning Commission held in December, 1952. In February 1955, the Planning Commission agreed to include the project estimated to cost Rs. 75.08 crores in the First Five Year Plan and decided that a modified project report should be prepared. In June 1955, the Government of India constituted the Nagarjunasagar Control Board consisting of representatives of the Governments of India, Andhra and Hyderabad. In November 1955, the Planning Commission sanctioned the commencement of preliminary works. The project was inaugurated by Pandit Jawaharlal Nehru in December 1955. In January 1956, the Government of India sanctioned loans for the commencement of preliminary works. Work on the project started in February 1956. Consequent on the reorganisation of States in November 1956, the Project vested in Andhra Pradesh exclusively, and the Nagarjunasagar Control Board was reconstituted to consist of representatives of the Government of India and Andhra Pradesh. In March 1957, the Planning Commission sanctioned the construction of cross drainage works for higher discharges. In February 1958, the Central Water and Power Commission prepared detailed specifications, schedules and drawings on Nagarjunasagar dam and appurtenant works. In July, 1960, the COPP Team on Nagarjunasagar Project recommended changes in the design features of the project. In September 1960, the Government of India cleared the project estima-

(26) Report of the COPP Irrigation and Power Team on Nagarjunasagar Project 1960, pp. 3, 7, 118; APPK XVII p. 4, Ann. I p. 3.

(27) Report of the COPP Irrigation and Power Team on Nagarjunasagar Project 1960, pp. 7-8, 17-18, 101-102; APDK VIII p. 85.

(28) MRK II pp. 190-191.

(29) APDK VIII p. 85.

On the 20th December, 1958, the Nagarjunasagar Control Board proposed the redistribution of 1.5 lakh acres of 1st crop within the accepted ayacut of Nagarjunasagar canals, but that proposal was not incorporated in the sanctioned Nagarjunasagar project of 1960. The estimate of October 1956 as revised from time to time and sanctioned in 1960 made a provision of Rs. 150 lakhs for distributaries for the additional ayacut of 1.5 lakhs acres in Krishna Delta; see Report of the COPP Irrigation and Power Team on Nagarjunasagar Project pp. 6, 129, 173-174, 183, 187; Letter of the Nagarjunasagar Control Board dated the 21st April, 1959, APDK X pp. 147, 154, 162, 167.

(30) APDK VIII pp. 83-110; APPK XVII pp. 6-9, 21-22.

ted to cost Rs. 91.12 crores. The sanctioned Project was included in the Second and Third Five Year Plans. In June 1969, the Planning Commission cleared the revised Nagarjunasagar Project estimated to cost Rs. 163.54 crores.(31)

Work on the dam has been completed. The right and left canals have been partly completed. The project commenced operation in 1967.

Utilisation of 264 T.M.C. of waters committed since 1056 : Work on the Project commenced in February, 1956. The declared object of the project was to utilise 263.6 T.M.C. of the Krishna waters annually for purposes of irrigation. The design features of the project and the areas proposed to be irrigated were changed during actual execution, but there was no alteration in the quantum of proposed utilisation. The working table at page 89 of the 1954 Report showed an annual withdrawal of 263.615 T.M.C. for Stage I of the project. In 1962, the report of the Krishna Godavari Commission stated that the annual diversion under the project would be 263.60 T.M.C. In March 1963, the Union Minister for Power and Irrigation declared in the Lok Sabha that 264 T.M.C. of the Krishna flows would be required for the sanctioned Nagarjunasagar Project. A note of the Planning Commission dated the 5th July, 1963, stated that the withdrawal under the Project Stage I would be 264 T.M.C. The sanction letter of the Planning Commission dated the 13th June, 1969, declared that the project proposed the withdrawal of 264 T.M.C. of the Krishna waters. Since 1956, the project was taken up and executed with the fixed and definite purpose of utilising 264 T.M.C. of the Krishna waters. The State of Mysore specifically admitted in its rejoinder that the utilisation proposed in Stage I of the project as originally envisaged and sanctioned by the Government of India was 264 T.M.C.(32) We also find that before September 1960, no objection to Stage I of the Project was raised by the other States.

Maharashtra argument that committed utilisation as on September 1960 was 163.5 T.M.C. : The COPP Team found that only two-thirds of the first crop irrigation on Nagarjunasagar canals provided in Stage I of the project could be done with F.R.L. 525 and that the demand for such irrigation would be 147.568 T.M.C. apart from evaporation loss of 15.940 T.M.C.(33). Maharashtra argued that, in the circumstances, the committed utilisation with F.R.L. 525 sanctioned in 1960 was 163.5 T.M.C. only.

It is to be observed that the 1954 report proposed to utilise 263.6 T.M.C. with F.R.L. 525 in Stage I of the project. The proposal for F.R.L. 525 was based on the unrealistic assumption that no new projects would be undertaken by the upper states. It was because the full irrigation envisaged in Stage I could not be done with F.R.L. 525, the COPP Team recommended the raising of F.R.L. to 546. This change in the internal design feature of the project was necessary for the full utilisation of 263.6 T.M.C.

We are satisfied that since 1956 the committed utilisation under the project is and has continued to be 264 T.M.C.

Raising of full reservoir level to 590 : The project report of 1954 provided for the raising of the full reservoir level to 590 in the final stage. The COPP Team recommended the raising of the full reservoir level to 546 and completion of the dam to the final height (F.R.L. 590) leaving the installation of the crest gates, 44 feet in height, to be done in the final stage. The raising of the F.R.L. to + 590 was the distinctive feature of stage II. In March 1963, the Union Minister for Irrigation and Power declared that Stage II could be cleared after investigations on diversion of Godavari supplies would be completed and the available supplies would be known. In the sanction letter of June 1969, the Planning Commission expressly refused to sanction the installation of crest gates. Nevertheless, the Andhra Pradesh Government installed crest gates 44 feet in height over the spillway crest. Consequently, the F.R.L. of the reservoir is now + 590 and at M.D.D.L. 510, the live storage capacity is 192 T.M.C. Maharashtra and Mysore strongly objected to the installation of crest gates.

However, for reasons to be given hereafter and considering that Andhra Pradesh should have carry-over storage in the Nagarjunasagar dam we are permitting Andhra Pradesh to store water by installing crest gates in the Nagarjunasagar dam.

Evaporation loss : The annual evaporation loss of Nagarjunasagar reservoir at F.R.L. 525 was said to be 12.77 T.M.C. in the 1954 Project Report, 14 T.M.C. in a letter of the Planning Commission dated the 5th July, 1963, and 15.94 T.M.C. in the Report of the COPP Team of 1960. The annual evaporation loss at F.R.L. 590 was said to be 16.795 T.M.C. in

(31) APDK II, pp. 63-75, 84-85; APDK I, 140; MRK II p. 190; Second Five Year Plan p. 362; Third Five Year Plan, p. 413.
(32) APPK I, p. 89, Krishna Godavari Commission Report, p. 241; KGCR Ann. X pp. 11-13; APDK VIII, p. 4, MYK III p. 36.
(33) COPP Report on Nagarjunasagar Project 1960, pp. 7-8, 14-15.

the Project Report.(34) In view of the fact that Andhra Pradesh is now permitted to raise the reservoir level to F.R.L. 590 by installing crest gates, we hold that an annual evaporation loss of 17 T.M.C. should be allowed for the Nagarjunasagar Project.

Irrigation of 1.5 lakh acres of first crop in the Delta : The Nagarjunasagar Project sanctioned in 1960 envisaged the development of 1.5 lakh acres of 1st crop in the Delta in addition to 10.5 lakh acres of 1st crop in the Delta existing in 1964. The annual withdrawal of 263.6 T.M.C. under the project included the demand of 23.2 T.M.C. for irrigation of the new 1.5 lakh acres of 1st crop in the Delta.(35) The requirement of the existing 10.5 lakh acres of 1st crop in the Delta had to be met out of the free supplies in the Krishna.

The scope of the Nagarjunasagar Project was changed from time to time. The project as sanctioned by the Planning Commission on the 13th June, 1969, provided for withdrawal of 264 T.M.C. of the Krishna waters and for irrigation of 20.54 lakh acres on Nagarjunasagar canals. The sanction letter dated the 13th June, 1969(36) stated that the revised Nagarjunasagar Project was found acceptable "subject to the technical comments and suggestions of the Central Water and Power Commission" and enclosed a copy of the comments of C.W. & P.C. The enclosed note stated that "This Project supplements irrigation of 1.5 lakh acres in the Delta". Thus, even the revised Nagarjunasagar Project as sanctioned on the 13th June, 1969 envisaged that the Project would supplement irrigation of all newly developed 1st crop area in the Delta to the extent of 1.5 lakh acres. It is admitted by Andhra Pradesh that it will implement the project as sanctioned in 1969. Andhra Pradesh argued that any direction for changing the scope of the project regarding use of the water allowed for it in the Krishna Delta would contravene section 108(2) of the States Reorganisation Act, 1956. The question does not arise as we do not propose to give such a direction.

Conclusion :

In allocating the waters of the river Krishna, the annual utilisation of 264 T.M.C. and evaporation loss of 17 T.M.C. under the Nagarjunasagar Project of Andhra Pradesh should be preferred to contemplated uses.

(5) *Krishna Delta Canal System* :

Dispute : Andhra Pradesh claims protection for the annual utilisation of 214 T.M.C. and evaporation loss of 4 T.M.C. under the Krishna Delta Canals. Maharashtra and Mysore contend that the annual utilisation of 161 T.M.C. only should be protected.(37)

Project : The Krishna Delta canal system is in operation since 1855. From time to time there were additions and alterations to the system.(38) The headworks are located at Vijayawada where the Krishna river flows through a gap between low hills. Beyond this point, stretching on either side of the river lies a wide alluvial plain known as the Krishna delta. The original weir has been replaced by a barrage. There are two main canals, one on each flank of the barrage. The(39) Krishna Eastern Main Canal on the Vijayawada side, with branch canals commands the eastern Delta. The Krishna Western Main Canal on the Seethanagram side, with branch canals commands the western Delta.

A number of new irrigation schemes in the Krishna Delta were executed or came into operation since 1951-52.(40)

Andhra Pradesh's claim : Andhra Pradesh claims that the committed annual utilisation in September 1960 under the Krishna Delta system was 214 T.M.C. (41)

In a statement prepared by the Government of India in 1967, the sanctioned annual diversion of the Krishna Delta system was said to be 214 T.M.C.(42) However, the particulars of the sanction were not given.

(34) APPK I pp. 89, 93; APDK-VIII pp. 4, 6; APPK XVII p. 90; COPP Report on Nagarjunasagar Project 1960 p. 15.

(35) Evidence of Jaffer Ali, pp. 174-175.

(36) APDK VIII pp. 83, 84, 91.

(37) MRDK VIII p. 64.

(38) KGCR Ann. VIII, p. 10.

(39) APPK XVII pp. 36-38.

(40) C.M.P. 16(75)/71-KWDT.

(41) APK I p. 213.

(42) MRDK II, pp. 114, 117; MYDK I, p. 215.

Annual diversions of water and areas irrigated: The annual diversions of water and the areas irrigated by the Krishna Delta system were: (43)

Year	Area irrigated by crops (in acres)			Withdrawals in T.M.C.		
	Kharif	Rabi	Total	June to December	January to May	Total
1941-42	9,87,690	3,884	9,91,574	149.37	12.54	161.91
1942-43	9,97,060	9,413	10,06,473	154.56	20.83	174.39
1943-44	10,44,169	15,763	10,59,932	183.13	28.16	211.29
1944-45	10,63,613	87,273	11,50,886	163.74	14.79	178.53
1945-46	10,80,916	21,285	11,02,201	164.86	9.46	174.32
1946-47	10,96,250	31,900	11,28,150	185.82	19.27	205.09
1947-48	11,06,411	28,626	11,35,037	175.09	17.48	192.57
1948-49	11,13,706	29,403	11,43,109	178.70	23.91	202.61
1949-50	11,81,241	46,658	12,27,899	154.96	19.97	174.93
1950-51	12,16,254	37,416	12,53,670	177.71	15.00	192.71
1951-52	11,81,851	45,816	12,27,667	177.01	9.13	186.14
1952-53	10,84,529	30,839	11,15,368	161.33	6.66	167.99
1953-54	11,08,079	45,325	11,53,404	167.11	35.54	202.65
1954-55	11,76,377	81,809	12,58,186	155.54	49.38	204.92
1955-56	11,65,732	1,08,362	12,74,094	160.97	47 47	208.44
1956-57	11,82,748	1,04,430	12,87,178	147.38	56.45	203.83
1957-58	11,39,819	1,03,956	12,43,775	172.89	48.11	221.00
1958-59	11,29,173	92,152	12,21,325	151.17	52.21	203.38
1959-60	10,24,816	1,61,641	11,86,457	177.08	64.90	241.98
1960-61				201.21	55.33	256.54
1961-62	11,28,972	1,33,763	12,62,735	195.39	53.46	248.85
1962-63	11,07,267	1,31,848	12,39,115	162.61	56.80	219.41
1963-64	11,35,817	1,64,368	13,00,185	181.33	43.98	225.31
1964-65	11,61,245	3,17,130	14,78,375	163.68	68.27	231.95
1965-66	11,53,454	1,87,725	13,41,179	173.79	39.09	212.88
1966-67	11,81,098	3,08,726	14,89,824	196.71	63.29	260.00
1967-68	11,83,463	4,83,950	16,67,413	191.73	92.91	284.64
1968-69	11,87,194	4,90,468	16,77,662	209.37	65.36	274.73

NOTE:—Upto 1953-54, there were no perennial crops. Since 1954-55 the area irrigated with perennial crops has been includedn the area irrigated during the Kharif season.

1941-42 to 1950-51 average area irrigated in Kharif 10,88,731, Rabi 31,162; Total 11,19,893 acres.

1951-52 to 1959-60 (9 years) average area irrigated in Kharif 11,32,569, Rabi 86,037; Total 12,18,606 acres.

1961-62 to 1968-69 (8 years) average area irrigated in Kharif 11,54,814.

Base period for 1st crop paddy is 180 days between June-July to November-December.

See KGCR Ann. VIII, p. 12-13, 16, KGCR Ann. IV, p. 4-7, APDK VII, pp. 1-7 APDK VI, pp. 1-5.

(43) MRDK XIII, Sheet XXXII. The irrigated area shown above is exclusive of area under green manure which was estimated to be 500,000 acres, see KGCR Ann. VIII, p. 11.

Increase in second crop area since 1953-54 : The Tungabhadra dam started functioning in July 1953. During 1953-54, the question of utilising the waters stored in the Tungabhadra reservoir until full development of irrigation under the Tungabhadra Project canals was discussed and it was decided that the surplus waters would be utilised for temporary second crop cultivation in the Krishna Delta on the understanding that such cultivation would not give rise to any special claims and different blocks in the Delta would be supplied with water in different years.(44) Pursuant to this arrangement and with the concurrence of the Mysore Government, water was released from the Tungabhadra dam since 1953-54 for second crop cultivation in the Delta. The area of second crop cultivation during rabi was 3,884 acres in 1941-42, 30,839 acres in 1952-53, 161,641 acres in 1959-60 and 4,90,468 acres in 1968-69. The increase in second crop area and withdrawal during rabi since 1953-54 was rendered possible by the temporary releases from the Tungabhadra dam. Andhra Pradesh has not acquired any right to the continuance of the temporary release from the Tungabhadra dam, or to special protection for the second crop area brought under cultivation since 1953-54.

During the 10 year period from 1943-44 to 1952-53, before the temporary releases from the Tungabhadra Dam started, the average second crop area irrigated in rabi was 37,498 acres.

Increase in first crop area :

The average first crop area irrigated in Kharif was 10,88,731 acres during the 10 year period 1941-42 to 1950-51, 11,32,569 acres during the 9 year period 1951-52 to 1959-60, 11,54,814 acres during 8 year period 1961-62 to 1968-69.

Increase in withdrawals : The average diversion during the 10 year period 1951-52 to 1960-61 was 209.69 T.M.C. against the average diversion of 186.84 T.M.C. during the 10 year period 1941-42 to 1950-51.

In 1961, Andhra Pradesh Government announced that it proposed to divert 214 T.M.C. annually.(45) The average diversion during the 8 year period 1961-62 to 1968-69 was 244.72 T.M.C.

The annual diversions do not furnish a correct indication of the actual utilisations for irrigation under the Delta canals. It may be mentioned that for irrigation of 11,13,706 acres in kharif and 29,403 acres in rabi during 1948-49 the annual diversion was 202.61 T.M.C., while for irrigation of the larger area of 11,81,241 acres in kharif and 46,658 acres in rabi during 1949-50 the annual diversion was 174.93 T.M.C. only. During 1958-59 the annual diversion was 203.38 T.M.C. for irrigation of 11,29,173 acres in kharif and 92,152 acres in rabi, while for almost the same diversion during 1953-54 the area irrigated was 11,08,079 acres in kharif and 45,325 acres in rabi.

Committed utilisation as on September, 1960 : The project requires water for (a) first crop irrigation (b) second crop irrigation (c) irrigation of green manure and fodder crops (d) navigation (e) water supply to towns (f) washing of salinity from irrigated areas near the coast and tidal drains.(46) There is evaporation loss of about 4 T.M.C. from the pondage at the Krishna barrage.(47)

It is common case before us that the average first crop area of 11,32,569 acres irrigated in kharif during 1951-52 to 1959-60 should be taken to be the first crop area irrigated annually in the Delta by September 1960. Andhra Pradesh is entitled to an allowance of water from the free supplies of the Krishna to meet the requirement of 10.5 lakh acres of first crop in the Delta. The Nandikonda Project report of 1954 shows that the reasonable requirement of 10.5 lakh acres of first crop in the Delta was 161.9 T.M.C. of water.

By September, 1960, an extra 82,569 acres in addition to 10.5 lakh acres of first crop in the Delta existing in 1954 were developed. In 1968-69, the newly developed first crop area in the Delta was 1.37 lakh acres.

We have already pointed out that the annual withdrawal of 263.6 T.M.C. of water under the Nagarjunasagar Project sanctioned in September 1960 included the demand of 23.2 T.M.C. of water for irrigation of new 1.5 lakh acres of 1st crop in the Delta in addition to 10.5 lakh acres of 1st crop existing in 1954. Even the revised Nagarjunasagar Project sanctioned in June 1969 will supplement irrigation of all newly developed area of 1st crop in the Delta to the extent of 1.5 lakh acres. In these circumstances and on a consideration of all relevant factors, we do

(44) SP III 189-190; MYDK XX pp. 4-9.
(45) KGCR Ann. VIII, pp. 12-13.
(46) KGCR Ann. VIII, pp. 14-15.
(47) This is claimed by Andhra Pradesh and assumed by Framji in his evidence pp. 543-544, 1262-63.

not propose to make any separate allowance of water out of the free supplies in the Krishna for the extra 82,659 acres of 1st crop in the Delta developed by September 1960 or for any other 1st crop area in the Delta developed since September 1960.

The average second crop area irrigated in rabi for the decade 1943-44 to 1952-53 was 37,498 acres. It is common case that this area may be taken to be the second crop area irrigated before the commencement of temporary releases from Tungabhadra Dam. Andhra Pradesh is not entitled to any special protection for the second crop area in excess of 37,498 acres brought under cultivation since 1953-54.

The COPP report on Nagarjunasagar Project(48) shows that the demand 1.5 lakh acres of second crop in the Krishna Delta was 23.3 T.M.C. On this basis, the annual demand for 37,498 acres of second crop was 5.82 T.M.C.

Taken separately, green manure had a delta of 0.4 feet and the requirement of 500,000 acres of green manure was 8.7 T.M.C. of water. (49) No separate data for the requirement of navigation and water supply to towns etc. are available. It appears that an allowance of 5.82 T.M.C. of water may not be sufficient to meet the requirement of 37,498 acres of second crop, 5,00,000 acres of green manure, navigation, water supply to towns and washing of salinity during the rabi season.

On a rough estimate, an allowance of 15.3 T.M.C. annually may be made for the reasonable requirement of second crop, green manure, navigation, water supply and washing of salinity etc. In addition, an allowance of 161.9 T.M.C. must be made for first crop irrigation.

In all, 177.20 T.M.C. of water on account of the committed utilisation of the Krishna Delta canals as on September 1960 besides annual pond loss of 4 T.M.C. should be allowed out of the free supplies in the Krishna.

Conclusion : In allocating the waters of the river Krishna, the annual utilisation of 177.20 T.M.C. and pond loss of 4 T.M.C. under the Krishna Delta Canal System of Andhra Pradesh should be preferred to contemplated uses.

(6) *Bhadra Reservoir Project* :

Dispute : Mysore claims that the annual utilisation of 56.8 T.M.C. under the Bhadra Reservoir Project should be protected. Maharashtra supports the claim. Andhra Pradesh contends that the annual use of 46.6 T.M.C. should be permitted. All the three States agree that annual evaporation loss of 4.9 T.M.C. should be allowed.(50)

Project : The Bhadra Reservoir Project is a multipurpose scheme comprising a storage reservoir across the river Bhadra near Lakkavalli, right bank and left bank canals and power houses.(51)

The object of the Madras-Mysore agreement of July 1944 was to enable the Mysore Government to undertake construction of the Project.(52) In October/November, 1946 the Mysore Government granted administrative sanction for constructing the works.(53) The construction started in April, 1947. The project commenced operation in 1957, but the ayacut was fully developed later.

The ayacut originally proposed in 1946 was 1,80,000 acres. In 1961, the Mysore Government proposed an ayacut of 2,41,550 acres. In 1969 the ayacut was 2,42,310 acres.(54) The cropping pattern was changed from time to time.

Right to utilisation of 56.8 *T.M.C.*

The Madras-Mysore agreement of July, 1944 permitted the Mysore Government to draw 57 T.M.C. for irrigation and power purposes from the Bhadra Reservoir.(55) The other riparian Governments were not bound by the agreement but Hyderabad, Bombay and Sangli agreed to raise no objection to the construction of the project. In 1946, the Mysore Government sanctioned construction of the project with the declared object of utilising 57 T.M.C. annually.(56) At the inter-State conference of 1951, the Mysore Government proposed to utilise 57 T.M.C. under the Project. To this proposal, no objection was raised by the other Governments.(57)

(48) Report of the Irrigation and Power Team on Nagarjunasagar Project (Committee on Plan Projects) 1960, p. 13, see also Nandikonda Project Report APPK I, p. 85.

(49) MRDK XIII, Sheet XXXIII; KGCR Ann. VIII, pp. 11, 14.

(50) MRDK VIII, p. 64.

(51) KGCR Ann. IX, pp. 74-75.

(52) APK II, pp. 168-174.

(53) MYDK XX, p. 1.

(54) KGCR Ann. IX, pp. 74, 78; MYPK VI, pp. 15, 17; MYK I, p. 98.

(55) APK II, p. 168; MYDK II, p. 401; APDK V, p. 32.

(56) MYPK VI, p. 13.

(57) APDK I, p. 28; MRDK I, p. 118, 124.

Before the Krishna Godavari Commission,(58) the Mysore Government stated that the annual irrigation requirement of the project was 56.75 T.M.C.

The list of sanctioned projects prepared by the Government of India in June, 1967 stated that the sanctioned annual diversion under the Bhadra Reservoir Project was 56.8 T.M.C.(59)

We find that since 1946 the Mysore Government has implemented the Project with the fixed and definite purpose of utilising at least 56.8 T.M.C. annually. *Prima facie,* Mysore has established that an annual utilisation of 56.8 T.M.C. was committed as on September, 1960.

Andhra Pradesh's contention.—Andhra Pradesh argued that Mysore, having repudiated the agreement of July, 1944 cannot claim protection for the agreed annual utilisation of 56.8 T.M.C. According to Andhra Pradesh, the annual water requirement of 2,42,310 acres was 46.6 T.M.C. on the basis of the cropping pattern proposed in 1946 and the duty proposed in 1961 and that consequently, an annual use of 46.6 T.M.C. of water only should be protected. We are unable to accept this contention.

Regarding Tunga anicut also, Andhra Pradesh advanced a similar argument. Subsequently, Andhra Pradesh abandoned the argument and agreed that the utilisation of 11.5 T.M.C. under the Tunga anicut should be permitted as contemplated by the Madras-Mysore agreement of July 1944.(60)

Mysore has established the right to the annual utilisation of 56.8 T.M.C. independently of the agreement of July 1944. Since 1946, Mysore took up the construction of the project with the avowed object of utilising 56.8 T.M.C. without any protest from the other States, and erected valuable permanent installations. Significant sector of its economy have become dependent upon the uses of those waters. Those uses must now be regarded as existing uses arising independently of an agreement and, as such, entitled to protection.

Conclusion.—In allocating the waters of the river Krishna, the annual utilisation of 56.80 T.M.C. and evaporation loss of 4.90 T.M.C. under the Bhadra Reservoir Project of Mysore should be preferred to contemplated uses.

(7) *Tungabhadra Left Bank Low Level Canal* :

Dispute.—Mysore claims that an annual utilisation of 92.3 T.M.C. under the Tungabhadra Left Bank Low Level Canal should be protected. Maharashtra supports the claim. Andhra Pradesh contends that the protection should be limited to 56.0 T.M.C. In the agreed list of projects(1), it is the common case of the parties that one half of the evaporation loss from the Tungabhadra reservoir to the extent of 9 T.M.C. annually is attributable to the Left bank canal.(61)

Project.—The agreement of June 1944 enabled the Hyderabad and Madras Governments to start the construction of the Tungabhadra Project. Construction of the Left Bank Low Level Canal was started in February, 1945 and completed in 1963. The Canal extends up to mile 141 within Mysore State limits. There was a proposal to extend the Canal beyond mile 141 to Telengana areas in Gadwal and Alampur Taluks, but the proposal was not implemented.

Water demand up to September 1960.—The agreement of June 1944(62) allowed Hyderabad to draw 65 T.M.C. of water from the Tungabhadra reservoir.

The Tungabhadra Project Report 1947 proposed a cropping scheme and a demand table of 92.25 T.M.C. of water for 4,50,000 acres of first and second crops and 1,35,000 acres of fuel and pasture in the Karnataka areas up to mile 141.(63)

In 1951, the Hyderabad Government claimed 100 T.M.C. for the Canal and 35 T.M.C. for the Canal extension.(64) The memorandum of agreement of 1951 allowed 65 T.M.C. for the Canal and made a lump sum allocation for projects under contemplation. Thereafter in 1952, the Hyderabad

(58) KGCR Ann. IX, p. 77.

(59) MYDK I, p. 216; MRDK II, p. 114.

(60) MRDK VIII, p. 62.

(61) MRDK VIII, p. 64.

(62) APK II, pp. 164-167.

(63) Tungabhadra Project Report (Hyderabad) pp. 8, 28, Ex. MYK 270.

(64) APK III, pp. 246, 251.

Government proposed to utilise 65 T.M.C. for the Canal and 20 to 35 T.M.C. for the Canal extension.(65)

In 1954, the Hyderabad Government finally approved of a cropping scheme for 5,80,000 acres in the Karnataka region up to mile 141.(66) In 1956, the Chief Engineer, Tungabhadra Project, prepared a demand table of 82.007 T.M.C. covering the water requirements of the approved cropping scheme. It was decided that more water would be utilised in the Telengana region in case of extension of the Canal beyond mile 141.(67)

Since 1956 up to September 1960, the use of 82 T.M.C. was considered sufficient for meeting the requirement of the approved cropping scheme for 5,80,000 acres in the Karnataka region to be irrigated from the Tungabhadra Left Bank Low Level Canal. We think that the annual utilisation of 82 T.M.C. of water under the Canal was committed as on September, 1960.

We are unable to accept Andhra Pradesh's contention that the use of 56 T.M.C. was sufficient for the requirement of the canal.

Subsequent increase in water demand.—In 1961, Mysore proposed to utilise 92.25 T.M.C. for irrigating 5,80,000 acres.(68) Recently Mysore proposed to utilise 111 T.M.C. for irrigating 6,55,000 acres.(69)

The list of sanctioned projects prepared by the Government of India in June, 1967 stated that the sanctioned annual diversion under the Tungabhadra Project (Mysore) was 111.3 T.M.C.(70) However, it was not stated by whom and when the sanction was given.

Tungabhadra Project Left Bank High Level Canal.—Some water is required for the Tungabhadra Project Left Bank High Level Canal. So far the highest annual utilisation for the Left Bank High Level Canal was 0.636 T.M.C. in 1964-65.(71) Mysore desires that the water allowance for the Left Bank Low Level Canal should cover the requirement of the Left Bank High Level Canal. An allowance of 1 T.M.C. should be sufficient for the High Level Canal.

Conclusion.—In allocating the waters of the river Krishna, the annual utilisation of 83 T.M.C. an evaporation loss of 9 T.M.C. under the Tungabhadra Project Left Bank Low Level Canal (including the Left Bank High Level Canal) of Mysore should be preferred to contemplated uses.

(8) *Vajayanagar Channels of Mysore :*

Dispute.—Mysore claims that an annual utilisation of 13.7 T.M.C. under the Mysore Vijayanagar Channels should be protected. Andhra Pradesh and Maharashtra contended that the utilisation under the Channels ought not to be separately provided for as they have been taken into account in fixing the gross utilisation under minor irrigation.(72)

Irrigation Schemes.—Several irrigation schemes, compendiously known as Vijayanagar or Pre-Moghul Channels were constructed by the Vijayanagar kings during 1509 A.D. to 1560 A.D.(73) Each scheme consisted of an anicut and an irrigation channel. One of the schemes *viz.*, Rampur Channel is situated in Andhra Pradesh.(74) The requirement of Rampur Channel has been provided for under minor irrigation and is not the subject-matter of the present discussion. The names and location of the schemes situated in Mysore are shown in the following table.(75)

(65) APPK X pp. 14, 16.

(66) APDK X p. 134; SP III p. 95.

(67) SP III pp. 95-97.

(68) KGCR Ann. IX pp. 20, 22.

(69) MYPK VIII pp. 13-15, 29.

(70) MYDK I p. 216; MRDK I pp. 114, 119.

(71) MYDK X pp. 3-11.

(72) MRDK VIII p. 65.

(73) MYPK VI. p. 71; H. C. Hart, New India's Rivers, p. 44.

(74) SP IV p. 7.

(75) MYPK VI pp. 70, 74. See also KGCR Ann. VIII pp. 140, 142.

Sl. No.	Name of Channel	Name of Weir	Location of weir		Remarks
			Name of Stream	Distance downstream of Tungabhadra Dam in miles	
1	2	3	4	5	6
Bellary District (on right side of river)					
1.	Basavanna	Vallabhapur		Sulomerged in Tungabhadra reservoir	Channel takes off directly from Tungabhadra dam on right side.
2.	Raya	Hosakote		Do.	Do.
3.	Bella	Hosur	Tungabhadra	1-1/2	
4.	Kalaghatta	Drainage channel	Halla	5	Channel utilises seepage from higher channels
5.	Turtha	Turtha	Tungabhadra	10	
6.	Ramsagar	Ramsagar	Tungabhadra	18	
7.	Kampli	Kampli	Tungabhadra	19	
8.	Belagoduhal	Drainage channel	Halla	22	Channel utilises seepage from higher channels.
9.	Sirugappa	Sirugappa	Tungabhadra	50	Consists of 7 bits.
10.	Desnur	Desnur	Tungabhadra	50	
Raichur District (on left side of river)					
11.	Koregal	Koregal	Submerged in Tungabhadra reservoir		Channel takes off directly from Tungabhadra Left Bank Canal.
12.	Hulgi	Hulgi	Tungabhadra	1-1/2	
13.	Shivapur	Shivapur	Do.	5	
14.	Anegundi	Sanapur	Do.	10	
15.	Upper Gangawati	Upper Gangawati	Do.	17	
16.	Lower Gangawati	Lower Gangawati	Do.	19	
17.	Bichal	Bichal	Do.	86	
18.	Bennur (In ruins)				

Utilisation under Vijayanagar channels have not been taken into account under minor irrigation : In the pleadings (76) and the agreed list of projects (77) Mysore did not treat Vijayanagar Channels as minor irrigation projects, though most of the channels taken separately might be using less than 1 T.M.C. of water annually. We are satisfied that the utilisations under the Vijayanagar Channels have not been taken into account in fixing the gross utilisations under minor irrigation. This fact is now conceded by learned Counsel for Maharashtra and Andhra Pradesh.(78)

Water utilisation : The annual gross utilisation in T.M.C. for the Vijayanagar Channels in Mysore was :—(79)

1951-52	52-53	53-54	54-55	55-56	56-57	57-58
5.71	5.71	5.71	5.71	5.71	5.71	5.71

58-59	59-60	60-61	61-62	62-63	63-64	64-65
5.71	5.71	5.71	9.64	9.64	9.64	9.64

65-66	66-67	67-68	68-69
9.64	9.64	9.64	9.64

Thus, the annual utilisation committed as on September 1960 was 5.71 T.M.C.

Conclusion : In allocating the waters of the river Krishna, the annual utilisation of 5.71 T.M.C. for the Vijayanagar Channels of Mysore should be preferred to contemplated uses.

(76) MYK I p. 98.

(77) MRDK VIII p. 65.

(78) See Minutes of Proceedings of the Tribunal on the 28th March. 1973.

(79) MRDK VIII pp. 13-14.

(9) *Rajolibunda Diversion Scheme* :

Scheme.—The Rajolibunda Diversion Scheme comprises an anicut across the Tungabhadra river near Rajolibunda village in Raichur District and a left bank canal about 89 miles long. The canal is lined and partly perennial and partly two seasonal.(80) The Hyderabad Government started construction of the project.

The States Reorganisation Act, 1956 and consequential arrangements.—Upon the reorganisation of States in 1956, the headworks and the initial 26/27 miles of the canal with an ayacut of 5,900 acres fell within Mysore State and the remaining portion of the canal with an ayacut of 87,000 acres fell within Andhra Pradesh. (81)

In October 1959, the Chief Engineers of Mysore and Andhra Pradesh agreed on a full supply discharge of 850 cusecs out of which 770 cusecs would be available at the Mysore-Andhra Pradesh border.(82) The two States agreed that the annual utilisation under the project in Mysore and Andhra Pradesh would be 1.1 T.M.C. and 15.9 T.M.C. respectively.(83) On January 25, 1971, Counsel for the two states made the following joint statement before the Tribunal :—

> "The States of Mysore and Andhra Pradesh state that the benefits of utilisations under the existing Rajolibunda Diversion Scheme are shared between the two States as mentioned herein below :—
>
> | | |
> |---|---|
> | Mysore | 1.2 T.M.C. |
> | Andhra Pradesh | 15.9 T.M.C." |

Dispute.—The project report contemplated that the Project's requirement of 17 T.M.C. would be met partly from 6.3 T.M.C. of return flow from irrigation under the Tungabhadra Project, and partly from the flow below Tungabhadra dam.(84) Maharashtra and Mysore contended that if return flow from irrigation is not taken into account in allocating the Krishna waters, the utilisation of 10.8 T.M.C. only under the Project should be protected. Mysore and Andhra Pradesh getting 0.80 T.M.C. and 10 T.M.C. respectively.(85) Andhra Pradesh disputed the contention.

Conclusion.—We think that the requirement of the Project can be met fully from the intermediate yield below Tungabhadra dam and regulated releasses from the dam. Moreover, in allocating the Krishna waters we have, as far as possible, taken into account the return flow from irrigation.

We hold that in allocating the waters of the river Krishna, the annual utilisation of 1.2 T.M.C. by Mysore and 15.9 T.M.C. by Andhra Pradesh under the Rajolibunda Diversion Scheme should be preferred to contemplated uses.

(10) *Kurnool-Cuddapah Canal* :

Dispute.—Andhra Pradesh claims protection for an annual utilisation of 69.4 T.M.C. under the Kurnool-Cuddapah Canal. Mysore contends that the protection should be limited to an annual utilisation of 19 T.M.C. only. Maharashtra says that the use of 20 T.M.C. only should be protected.(86)

Scheme.—The K. C. Canal scheme comprises an anicut across the Tungabhadra river at Sunkesala, and a right bank canal. Part of the main canal is lined.(87) The canal serves chronically drought affected areas in Kurnool, Mahboobnagar and Cuddapah Districts. It provides water supply to Kurnool and Nandyal and some navigation facilities.

The K. C. Canal is one of the oldest irrigation works on the Tungabhadra. It is in operation since 1866.

The designed capacity of the canal was 3,000 cusecs. The canal had a large command area and an ayacut of 1,96,227 acres was envisaged. The design, construction and working of the canal disclosed serious defects. Due to damage to the anicut, lowering of the crest and general deterioration, the capacity was greatly reduced and the ayacut shrank to 1,03,000 acres.(88)

During 1940-41 to 1950-51, the average irrigated area was 97,878 acres and the average annual utilisatisn was 33.02 T.M.C.(89) At the inter-State conference of July 1951, Madras stated that the area

(80) KGCR Ann. IX, p. 27; MYPK X p. 5.
(81) SP II p. 132; KGCR Ann. IX, p. 27.
(82) SP III p. 103.
(83) SP III p. 132.
(84) APPK XVI pp. 1, 2.
(85) MRDK VIII p. 65.
(86) MRDK VIII p. 65.
(87) KGCR Ann. VIII pp. 17, 21; APPK XVII p. 23.
(88) KGCR Ann. VIII pp. 17, 18; APPK XVII pp. 23, 24; SP III p. 14; APPK II pp. 11-12.
(89) KGCR Ann. VIII, p. 19.

irrigated annually was 75,000 acres first crop and 10,000 acres second crop. The C.W. & P.C. technical note prepared for the conference showed an annual utilisation of 10 T.M.C. only. (90)

The river supplies were used mainly for irrigation of dry crops in year of deficient rainfall. A large area of Cholam was watered and the duty allowed for was 120 acres per cusec. For paddy, the working duty was about 30 to 45 acres per cusec. (91)

Remodelling.—The Khosla Committee (Technical Committee for optimum utilisation of Krishna and Godavari Waters) recommended that the K. C. Canal should be remodelled for a discharge of 6,000 cusecs to feed its own requirement and that of several other canals. The Committee was of the view that the K. C. Canal required a discharge of 1,940 cusecs for its ayacut of 1.94 lakh acres. (92)

However, the Andhra Government decided to remodel the Canal for a discharge of 3,000 cusecs with a view to irrigate annually 1,96,227 acres, half paddy and half other crops. (93)

The remodelling was taken up in 1955 and completed in 1960-61 at a cost of Rs. 7.09 Crores. (94) The Central Government granted loan assistance during the Second Five Year Plan. (95) The Canal was shown as continuing scheme in the Third Five Year Plan. (96)

Ayacut and cropping pattern.—In March 1960, the Andhra Pradesh Government approved of the localisation of ayacut and the following crop pattern for an area of 2,78,000 acres :—(97)

Crop	Area in Acres
1	2
Single wet Abi	1,26,000
Single dry	1,28,000
Double wet	10,000
Sugarcane	14,000
	2,78,000

Out of the ayacut of 2,78,000 acres, only 45,000 acres is within the Krishna drainage basin; the remaining 2,33,000 acres lie in Pennar valley.(98)

In 1961, the Andhra Pradesh Government proposed the following cropping pattern :—(99)

Crop	Cropped area in acres	Percentage of cropped area	Delta at canal head in feet
1	2	3	4
Kharif paddy	1,36,000	47.2	4.4
Kharif other crops	64,000	22.2	1.5
Rabi Paddy	10,000	3.5	6.1
Rabi other crops	64,000	22.2	1.5
Perennial (Sugarcane)	14,000	4.9	7.4
	2,88,000	100	

Annual withdrawals and irrigated areas.—The annual withdrawals and areas irrigated under the K. C. Canal were as follows :—(100)

Year	Annual diversion in T.M.C.	Area irrigated annually in acres			Total
		Kharif	Rabi	Perennial	
1	2	3	4	5	6
1951-52	33.69	82,446	14,696		97,142
1952-53	33.43	85,560	13,375		98,935
1953-54	41.70	91,284	17,717		1,09,001
1954-55	29.32	1,00,752	11,379		1,12,131
1955-56	23.92	99,689	7,733		1,07,422

(90) APDK IV p. 31; MRDK I p. 117.
(91) W. M. Ellis, College of Engineering Manual 1955 Ed. pp. 1, 7; Kistna-Pennar Project (1951-Scheme) APPK II, pp. 11-12, 50-51.
(92) Report of the Technical Committee for Optimum Utilisation of Krishna and Godavari waters, pp. 49, 53, 55-58, 85, 99-101.
(93) APDK VIII pp. 21, 26; KGCR Ann. VIII pp. 17, 18; APPK XVII, p. 24.
(94) CMP. 16(75)/71-KWDT, Ex. AVK 430.
(95) APDK X pp. 144-145.
(96) Third Five Year Plan p. 413.
(97) APDK X pp. 42-44.
(98) KGCR Ann. VIII p. 21.
(99) KGCR Ann. VIII p. 20.
(100) MRDK XIII, Sheet XXXIV.

1	2	3	4	5	6
1956-57	30.63	95,974	6,264		1,02,238
1957-58	38.47	1,05,522	12,897		1,18,419
1958-59	40.56	1,27,620	21,521		1,49,141
1959-60	39.53	1,25,471	10,688		1,36,139
1960-61	60.98	1,27,620	21,521		1,49,141
1961-62	54.56	1,52,785	35,723		1,88,508
1962-63	60.63	1,44,435	44,527		1,88,962
1963-64	65.33	1,55,183	52,487		2,07,670
1964-65	60.41	1,64,668	67,311		2,31,979
1965-66	67.28	1,60,871	62,805		2,23,676
1966-67	68.45	1,43,242	68,689		2,11,931
1967-68	72.68	1,51,364	1,05,287	16,093	2,72,744
1968-69	83.23	1,56,591	1,09,254	17,760	2,83,605

See KGCR Ann. IV pp. 282-84, MRDK VIII pp. 21-22, APDK VII pp. 12-19, APDK VI pp. 8-11, APDK II, pp. 60-62, SP III pp. 171-172.

There is a foot note at page 39 of KGCR Ann. IV as under for year 1960-61 :—

"Not considered for calculating the average, as the canal was also used for escaping river supplies in view of repair work to the anicut."

Larger withdrawal during rabi since 1953-54 *due to release from Tungabhadra dam.*—Increased withdrawals during rabi since 1953-54 became possible because of temporary releases from the Tungabhadra dam for the benefit of the second crop cultivation in the Krishna Delta. The Tungabhadra dam started functioning in July, 1953. Releases were made from the Tungabhadra dam since 1953-54 on the clear understanding that they would not give rise to any special right. (101) Due to such releases, there were large increases in the inflow at Sunkesula anicut during the rabi season, January to May, from 1953-54 to 1968-69. (102)

The withdrawals by K. C. Canal during the rabi season, January to May, which were 4.62 T.M.C. in 1952-53 increased to 31.19 T.M.C. in 1968-69.(103) The increased withdrawals during rabi since 1953-54 could not be made unless there were larger inflows at Sunkesula anicut on account of the temporary releases from the Tungabhadra dam. In view of the larger withdrawals, the area irrigated during the rabi Season by the K.C. Canal increased from 13,375 in 1952-53 to 1.09.254 acres in 1968-69.

Committed utilisation of K.C. Canal as on September 1960.—Before the Krishna Godavari Commission, the Andhra Pradesh Government proposed the annual utilisation of 39.87 T.M.C. for irrigating 2,78,000 acres. The monthly demands were June 5.81, July 5.97, August 6.07, September 6.60. October 6.50, November 1.27, December 1.88, January 1.36, February 1.35, March 1.45, April 0.93, May 0.68 : Total 39.87 T.M.C..(104)

The list of sanctioned projects prepared by the Government of India in June 1963 stated that the annual sanctioned diversion under the K.C. Canal was 39.9. T.M.C.(105)

(101) SP III, pp. 189-192.
(102) KGCR Ann. II, p. 89; APDK-VI, pp. 8-11.
(103) KGCR Ann. IV, p. 39; APDK VI, p. 11.
(104) KGCR Ann. VIII, p. 19.
(105) MYDK I p. 215.

Andhra Pradesh Government admits that the committed utilisation as on September 1960 was 39.0 T.M.C.(106)

Andhra Pradesh's claim.—Andhra Pradesh claims protection for the annual utilisation of 69.9 T.M.C. as shown below :—(107)

For K. C. Canal committed as on September, 1960	39.9 T.M.C.
For improvements to K. C. Canal Committed after September, 1960	29.5 T.M.C.
	69.4 T.M.C.

Andhra Pradesh's claim for protection of excess withdrawals since September 1960 is rejected.—The committed utilisation as on September 1960 was 39.9 T.M.C. only.

In 1961, Andhra Pradesh Government admitted that the annual utilisation of 39.9 T.M.C. would be sufficient to meet the requirements of an ayacut of 2,78,000 acres. It is not shown to our satisfaction that for irrigating the same area, the annual utilisation of 69.4 T.M.C. is necessary.

The annual diversions for the K.C. Kanal do not furnish a correct estimate for the actual water supplied to the fields. The diversions by the K.C. Canal have been relatively high when compared with the areas irrigated, largely because there was considerable seepage and wastage from the canal.(108) With more economical management, the waste can be avoided. The earlier proposals show that efficient irrigation is possible with a higher duty of water. Avoidable waste is a relevant factor in determining whether the excess withdrawals should be given a preferred status in equitable apportionment.

The Khosla Committee recommended the utilisation of 29.20 T.M.C. under the K.C. Canal, and the Andhra Pradesh Government agreed to the proposal.(109) The ayacut under the Canal was then 1.94 lakh acres.(110) On this basis also, the utilisation for an ayacut of 2,78,000 acres works out to $\frac{29{\cdot}20 \times 270}{194} = 40.06$ T.M.C.

For all these reasons we hold that the annual withdrawals in excess of 39.9 T.M.C. under the K.C. Canal should not receive protection.

Mysore argument.—Mysore argued that in view of the fact that the requirement of the K.C. Canal when remodelled to 3,000 cusecs capacity would be 29.2 T.M.C. and in view of the finding of the Khosla Committee that the canal's own requirement was 1940 cusecs, the utilisation of the canal works out to about 19 T.M.C. We are unable to accept this contention. As already stated, the Khosla Committee recommended the utilisation of 29.20 T.M.C. by the K.C. Canal for an ayacut of 1.94 lakh acres, and on this basis the utilisation for an ayacut of 2.78 lakh acres works out to 40.06 T.M.C.

Maharashtra argument.—Maharahstra argued that for an average ayacut of 97,778 acres during 1941-42 to 1951-52(111) an utilisation of 10 T.M.C. was considered sufficient by the C.W.&P.C.,(112) and, therefore, for an ayacut of 1,96,227 acres, the canal should receive protection for the use of $\frac{10 \times 1,96,277}{97,778}$ or 20 T.M.C. only. But we find that before the remodelling, the canal was not functioning efficiently because of reduction in canal capacity and general deterioration of the canal condition and the actual withdrawals during 1941-42 to 1951-52 do not furnish a correct estimate of the requirement of the ayacut under the canal.

Conclusion.—The annual utilisation of 39.9 T.M.C. committed as on September 1960 is necessary and sufficient for irrigating 2,78,000 acres under the remodelled K. C. Canal.

We hold that in allocating the waters of the river Krishna, the annual utilisation of 39.90 T.M.C. under the K.C. Canal should be preferred to contemplated uses.

Minor irrigation works using less than 1 T.M.C. annually :

Agreements.—On the 26th August, 1971, the parties filed agreed statements giving minor irrigation particulars in respect of areas irrigated in the Krishna

(106) APK I pp. 52, 123.
(107) APK I pp. 123-124.
(108) KGCR Ann., VIII, p. 21.
(109) APDK VIII p. 26.
(110) Report of the Technical Committee (Khosla Committee) on the optimum utilisation of the ishna and Godavari waters p. 55
(111) KGCR Ann. VIII p. 22.
(112) MRDK I p. 117.

basin in Maharashtra, Mysore and Andhra Pradesh and the average gross utilisation computed on the basis of average irrigated areas and agreed average duties for the periods 1941-42 to 1950-51, 1951-52 to 1960-61 and 1960-61 to 1966-67.(113)

On the 27th and 30th August, 1971, the parties filed agreed supplementary statements showing that the figures of minor irrigation in the earlier statement did not include certain minor irrigation works and irrigation from wells.(114)

On the 1st September, 1971, the parties filed another agreed supplementary statement giving basinwise irrigated area and utilisation under minor irrigation works in Krishna basin in the three States.(115)

On the 4th April, 1973, the parties filed an agreed statement that the figures of average utilisation under minor irrigation works included evaporation losses. Water spread of tanks is inordinately large as compared with the corresponding ayacut with the result that losses by evaporation are as large as supplies diverted for irrigation from these works.(116)

Utilisation of water under minor irrigation works upto 1960-61.—The sub-basinwise average area irrigated and utilisation under minor irrigation works in Krishna basin in Maharashtra State for the decade 1951-52 to 1960-61 are given below :—

Sr. No.	Sub-basin	Area irrigated in Acres			Utilisation in Mcft.		
		1st Crop	2nd Crop	Total	1st Crop	2nd Crop	Total
1	2	3	4	5	6	7	8
1.	K-1	64,175	9,106	73,281	10,406	728	11,134
2.	K-2	896	177	1,073	112	14	126
3.	K-3	5,293	125	5,418	1,018	10	1,028
4.	K-5	33,555	7,277	40,832	3,661	584	4,245
5.	K-6	764	116	880	99	9	108
	TOTAL	1,04,683	16,801	1,21,484	15,296	1,345	16,541

Our attention was drawn to the following projects of Maharashtra using less than 1 T.M.C. of water annually.

Sr. No.	Sub-basin	Name of project	Utilisation in T.M.C.
1	2	3	4
1.	K-1	Nehr Tank	0.5
2.	K-5	Budihal tank	0.9
3.	K-5	Mehkari project	0.7
4.	K-5	Kada project	0.5
5.	K-5	Chandani project	0.9
6.	K-6	Harni project	0.6
		TOTAL	4.1

Learned Advocate General of Maharashtra stated that he would be asking for allocation of waters in respect of these six projects. As Maharashtra will get allocation of waters for these six projects, he is not asking for any special protection or preference over contemplated users regarding these projects.

(113) MRDK VIII pp. 25-27.

(114) MRDK VIII pp. 58-60, 68A.

(115) MRDK VIII pp. 69-79.

(116) Krishna Godavari Commission Report, pp. 166-167; COPP Report on minor Irrigation Works (Mysore State), pp. 7-8.

The sub-basin-wise average area irrigated and utilisation under minor irrigation works in Krishna basin in Mysore State for the decade 1951-52 to 1960-61 are given below :—

Sl. No.	Sub-basin	Area irrigated in acres			Utilisation in Mcft.		
		1st Crop	2nd Crop	Total	1st Crop	2nd Crop	Total
1	2	3	4	5	6	7	8
1.	K-1	1,823	176	1,999	161	20	181
2.	K-2	13,733	879	14,612	2,354	112	2,466
3.	K-3	10,330	1,016	11,346	913	119	1,032
4.	K-4	51,131	1,224	52,355	3,904	136	4,040
5.	K-5	156	20	176	13	2	15
6.	K-6	20,743	579	21,322	5,788	181	5,969
7.	K-7	2,431	28	2,459	678	11	689
8.	K-8	3,06,568	10,521	3,17,089	45,427	2,510	47,937
9.	K-9	1,11,871	9,886	1,21,757	26,618	3,251	29,869
		5,18,786	24,329	5,43,115	85,856	6,342	92,198

The above figures do not include the following utilisations.

Sub-basin	Name of Scheme	Utilisation in T.M.C.
1	2	3
K-4	Kolchi weir	0.53
K-6	Hathikoni	0.50
K-8	Jambad Halla	0.70
K-8	Kanakanala	0.40

Adding the above utilisations, the sub-basinwise utilisation under minor irrigation works in Krishna basin in Mysore State for the decade 1951-52 to 1960-61 was as follows :—

1	2	3	4	5
3.	K-3	913	119	1,032
4.	K-4	4,434	136	4,570
5.	K-5	13	2	15
6.	K-6	6,288	181	6,469
7.	K-7	678	11	689
8.	K-8	46,527	2,510	49,037
9.	K-9	26,618	3,251	29,869
	TOTAL	87,986	6,342	94,328

Sl. No.	Sub-basin	Utilisation in M.C. ft.		
		I Crop	II Crop	Total
1	2	3	4	5
1.	K-1	161	20	181
2.	K-2	2,354	112	2,466

The utilisation under Chitwadgi and Harinala Schemes are not included in the above figures for the decade 1951-52 to 1960-61, as the construction of those schemes were started subsequently. Vijayanagar channels of Mysore are not included under minor irrigation works.

The sub-basinwise average area irrigated and utilisation under minor irrigation works in Krishna Basin in Andhra Pradesh for the decade 1951-52 to 1960-61 are given below:—

Sl. No.	Sub-basin	Area irrigated in acres			Utilisation in T.M.C.		
		I Crop	II Crop	Total	I Crop	II Crop	Total
1	2	3	4	5	6	7	8
1.	K-6	19,986	2,036	22,028	3.000	0.509	3.509
2.	K-7	2,34,899	37,500	2,72,399	35.598	9.422	45.020
3.	K-8	29,897	3,538	33,435	5,446	1.009	6.455
4.	K-9	24,725	8,755	33,480	4.945	2.627	7.572
5.	K-10	1,05,056	20,328	1,25,384	15.758	5.082	20.840
6.	K-11	37,416	6,138	43,554	5.613	1.533	7.146
7.	K-12	1,50,511	12,554	1,63,065	22.578	3.131	25.709
	TOTAL in Andhra Pradesh	6,02,490	90,849	6,93,345	92.938	23.313	116.251

We think that the committed utilisation for both first and second crops as on September 1960 should be protected. All utilisation for first and second crops have been taken into account in fixing the dependable flow of the Krishna. The fact that the utilisation for second crop is dependent on uncertain north-east monsoon rainfall and is more variable than the utilisation for first crop is not a sufficient ground for refusing protection to the utilisation for second crop.

It is common case before us that the average utilisation under minor irrigation works for the decade 1951-52 to 1960-61 should be taken to be the utilisation under those works as on September 1960.

Conclusion.—We hold that in allocating the waters of the river Krishna, the following sub-basinwise annual utilisation under minor irrigation works, using less than 1 T.M.C. of water annually and committed as on September 1960 should be preferred to contemplated uses.

Utilisation in T.M.C.

Sl. No.	Sub-basin	Maharashtra	Mysore	Andhra Pradesh	Total
1	2	3	4	5	6
1.	K-1	11.13	.18		11.31
2.	K-2	.13	2.47		2.60
3.	K-3	1.03	1.03		2.06
4.	K-4		4.57		4.57
5.	K-5	4.25	.02		4.27
6.	K-6	.11	6.47	3.51	10.09
7.	K-7		.69	45.02	45.71
8.	K-8		49.04	6.46	55.50
9.	K-9		29.87	7.57	37.44
10.	K-10			20.84	20.84
11.	K-11			7.15	7.15
12.				25.71	25.71
		16.65	94.34	116.26	227.25

Final conclusion under Issue II(3).—In allocating waters of the river Krishna, the following utilisations (including evaporation losses) of water of the Krishna river system by the three States should be preferred to contemplated uses :—

MAHARASHTRA

Sub-basin	Project	Water utilisation including evaporation losses In T.M.C.	
1	2	3	4
K-1			186.23
	Krishna canal ex Khodsi Weir	2.70	
	Koyna Hydro-Electric	74.80	
	Warna	47.70	
	Tulshi	2.60	
	Radhanagri	11.00	
	Krishna	36.30	
	Minor Irrigation	11.13	
		186.23	
K-2			.13
	Minor Irrigation	.13	
K-3			1.03
	Minor Irrigation	1.03	
K-5			250.65
	Mutha System ex Khadakwasla	23.50	
	Tata Hydel Works	45.00	
	Ghod	10.40	
	Kukadi	20.10	
	Visapur Tank	0.50	
	Bhima	90.20	
	Nira Canal System	34.60	
	Vir Dam	14.70	
	Mhaswad	2.20	
	Ashti Tank	0.70	
	Mangi Tank	1.10	
	Ekruk Tank	1.80	
	Khasapur Tank	1.30	
	Sholapur city Water Supply	0.30	
	Minor Irrigation	4.25	
		250.65	
K-6			1.61
	Kurnoor	1.50	
	Minor Irrigation	.11	
		1.61	
TOTAL			439.65

MYSORE

Sub-basin	Project	Water utilisation including evaporation losses In T.M.C.	
1	2	3	4
K-1			.18
	Minor Irrigation	.18	

1	2	3	4
K-2			105.47
	Upper Krishna	103.00	
	Minor Irrigation	2.47	
		105.47	
K-3			37.63
	Ghataprabha Stages I & II	36.60	
	Minor Irrigation	1.03	
		37.63	
K-4			41.77
	Malaprabha	37.20	
	Minor Irrigation	4.57	
		41.77	
K-5			.02
	Minor Irrigation	.02	
K-6			8.37
	Chandrampalli	1.90	
	Minor Irrigation	6.47	
		8.37	
K-7			.69
	Minor Irrigation	.69	
K-8			272.35
	Bhadra Anicut	3.10	
	Tunga Anicut	11.50	
	Ambligola	1.40	
	Anjanpur	2.50	
	Dharma canal and Dharma Project	2.20	
	Tungabhadra Project Right Bank Low Level canal	22.50	
	Tungabhadra Project Left Bank Low Level Canal (including Left Bank High Level canal)	92.00	
	Tungabhadra Right Bank High Level Canal Stages I and II	17.50	
	Hagari Bomanhalli	2.00	
	Bhadra Reservoir	61.70	
	Vijayanagar Channel	5.71	
	Rajolibunda Diversion	1.20	
	Minor Irrigation	49.04	
		272.35	
K-9			38.07
	Vanivilas Sagar	8.20	
	Minor Irrigation	29.87	
		38.07	
	TOTAL		504.55

ANDHRA PRADESH

Sub-basin	Project	Water utilisation including evaporation losses	In T.M.C.
K-6			5.51
	Kotipallavgu	2.00	
	Minor Irrigation	3.51	
		5.51	
K-7			523.32
	Koilsagar	3.90	
	Okachettivagu	1.90	
	Dindi	3.70	
	Guntur Channel	4.00	
	Vaikunthapuram Pumping Station	2.60	
	Nagarjunasagar	281.00	
	Krishna Delta Canals	181.20	
	Minor Irrigation	45.02	
		523.32	
K-8			126.26
	Tungabhadra Right Bank Low Level Canal	29.50	
	Tungabhadra Right Bank High Level Canal Stages I and II	32.50	
	Gajuledinne	2.00	
	Rajolibunda Diversion	15.90	
	Kurnool Cuddapah Canal	39.90	
	Minor Irrigation	6.46	
		126.26	
K-9			12.47
	Bhairavanitippa	4.90	
	Minor Irrigation	7.57	
		12.47	
K-10			34.14
	Musi	9.40	
	Water Supply to twin city of Secunderabad and Hyderabad	3.90	
	Minor Irrigation	20.84	
		34.14	
K-11			11.15
	Palair	4.00	
	Minor Irrigation	7.15	
		11.15	
K-12			36.31
	Pakhal Lake	2.60	
	Muniyeru	3.30	
	Lankasagar	1.00	
	Wyra	3.70	
	Minor Irrigation	25.71	
		36.31	
	TOTAL		749.16

The preferred utilisation in the Krishna basin is shown sub-basinwise in the following table :—

Sub-basin	Maha-rashtra	Mysore	Andhra Pradesh	Total
1	2	3	4	5
K-1 . . .	186.23	.18		186.41
K-2 . . .	.13	105.47		105.60
K-3 . . .	1.03	37.63		38.66
K-4 . . .		41.77		41.77
K-5 . . .	250.65	.02		250.67
K-6 . . .	1.61	8.37	5.51	15.49
K-7 . . .		.69	523.32	524.01
K-8 . . .		272.35	126.26	398.61
K-9 . . .		38.07	12.47	50.54
K-10 . . .			34.14	34.14
K-11 . . .			11.15	11.15
K-12 . . .			36.31	36.31
	439.65	504.55	749.16	1693.36

Issue II(3) is answered accordingly.