

GOVERNMENT OF MADHYA PRADESH
PUBLIC WORKS DEPARTMENT



REPORT
OF
MADHYA PRADESH WATER-RATES
COMMITTEE, 1959-61

(WITH APPENDICES II & IV)



सत्यमेव जयते

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REPORT OF THE MADHYA PRADESH WATER RATES COMMITTEE, 1959-61

CHAPTER I—INTRODUCTION

1.1 Before the re-organisation of States, the integrating units of new State of Madhya Pradesh were under different political administrations. Under these circumstances, there was great diversity in the irrigation laws, water rates and the methods of irrigation management and assessment. After re-organisation, unification of irrigation laws and water rates has been the aim of the Government, in order to bring homogeneity in irrigation administration and management. With this end in view, the Government of Madhya Pradesh constituted the Madhya Pradesh Water Rates Committee, in their Notification No. 298/5076/G-XIX-57, dated the 20th January 1959 (Pausa 30, 1880). Notification.

1.2 The Committee consisted of the following members:— Personnel of the Committee.

CHAIRMAN

- (1) Deputy Minister, P.W.D., Madhya Pradesh, Bhopal.

MEMBERS

- (2) Shri K. P. Pande, M.L.A.
- (3) Shri Bhuwan Bhaskar Singh, M.L.A.
- (4) Shri Udai Ram, M.L.A.
- (5) Shri Kamta Prasad 'Master', M.L.A.
- (6) Shri Shyama Charan Shukla, M.L.A.
- (7) Shri Vrinda Sahai, M.L.A.
- (8) Shri Vishwanath Ayachit, M.L.A.
- (9) Shri Bhagwan Singh, M.L.A.
- (10) Shri V. Y. Tamaskar, M.L.A.
- (11) Shri Arjun Singh, M.L.A.
- (12) Shri Ved Ram, M.L.A.
- (13) Shri Sawai Singh Mandloi, M.L.A.
- (14) The Chief Engineer, P.W.D. (Irrigation Branch), Madhya Pradesh.
- (15) The Director of Agriculture, Madhya Pradesh, Rewa.
- (16) The Director of Land Records, Madhya Pradesh, Gwalior.
- (17) The Commissioner, Indore Division, Indore.
- (18) The Superintending Engineer, Narmada Circle, Jabalpur.
- (19) The Chief Engineer, Chambal Hydel and Irrigation Scheme, Jhalawar Railway Station, Chambal.

SECRETARY

- (20) The Superintending Engineer, Mahanadi Circle, Raipur.

There was no change in the personnel except, that Shri R. J. Kalamkar, who retired as Director of Agriculture, was succeeded by Shri Mohd. Akbar. On behalf of the Director of Agriculture, Shri N. S. Apte, Joint Director of Agriculture attended the meetings and accompanied on tours.

Terms of reference, 1.3 The terms of reference of the Committee were—

- (i) To enquire into and examine the existing water rate structure prevailing in the various regions of Madhya Pradesh and to suggest and report on—
 - (a) the feasibility of levying water rate on a uniform basis in the whole State;
 - (b) if uniformity in rates is feasible, what should be its basis; and
 - (c) if uniformity is not feasible, what should be the basis for determining the rates for various regions and/or various crop patterns.
- (ii) Suggest measures specially designed to improve returns on the outlay on new works with special reference to the desirability of splitting the water rate into—
 - (a) compulsory levy on the entire area within command of a work; and
 - (b) water rate for the water taken;
- (iii) To review and examine the prevailing system of administration and management of the State Irrigation works and to recommend—
 - (a) measures to improve efficiency of distribution of water beyond the outlet;
 - (b) measures to popularise irrigation system among agriculturists;
 - (c) measures to improve the existing agreement system and for its extension to areas where it is not in existence; and
 - (d) measures to bring about uniformity in collection of canal revenues and to suggest the agencies through which realisation can most suitably be effected.

Questionnaire.

1.4 The Committee held its first meeting at Bhopal on March 2, 1959 and finalised a questionnaire, for eliciting public opinion. Among other items, information was asked for, on the present water rate structure, water rates for various irrigation practices, views on fixation of water rates and levy of compulsory cess and management of irrigation works.

The nature and extent of work done by the Committee.

1.5 The Committee toured important regions of the State and made enquires on the main points of the questionnaire from cultivators and irrigators. They also

visited different types of irrigation works and their commanded areas. During the tours, the Committee held meetings at several places and collected evidence of cultivators, leading public workers and officers of various departments.

The members of the Committee, during conversation with the cultivators, got an impression that, there existed certain amount of mis-apprehension with regard to the object and scope of enquiry by the Committee. At every stage, the Committee tried to explain to the cultivators, that the object of the enquiry was to arrive at a sound policy for the management of irrigation works in the State and to examine and suggest suitable water rate structure.

1.6 The task before the Committee was rather difficult and complicated. Before it could embark upon its work, the Committee had to collect information relating to different irrigation systems and their administration in various regions of the State. It also obtained statistical information from the State Departments, Directorates and Central Ministries, *e.g.*, Planning Commission, Central Water and Power Commission, Ministry of Food and Agriculture, Director of Meteorological Department, etc., regarding rainfall, yield of crops, soils, socio-economic condition of cultivators, etc. The Committee received as many as 272 written replies to the questionnaire and analysed them.

For a comprehensive study of several aspects of the enquiry, the Committee considered that, visits to selected major and minor works in the different regions, as well as examination of persons doing irrigation was necessary.

The Committee gained very valuable information from these study tours. In all, 37 places were visited and Committee met several thousand persons and collected their views. The Committee also visited Matatila Dam in Uttar Pradesh and Hirakud Dam in Orissa State with a view to gain idea of the working of irrigation projects in the neighbouring States. The Committee, in all, held twelve meetings, for discussing the data collected from the study tours and other sources, from time to time. It will be appreciated that all this must involve a great deal of time and labour. In particular, the Committee had to spend considerable time in discussing various issues relating to water rate structure and in evolving definite irrigation policies and rates to be recommended to the Government. The Committee, therefore, could not finish its work in the time allotted and had to ask for several extensions from time to time. The Committee has all along been conscious of the delay in submitting the report, but feels that it was inevitable.

The report was finalised by the Committee in its twelfth meeting held at Bhopal on the 7th February, 1961 with notes of dissent from the following members :—

(1) Shri V. Y. Tamaskar, M.L.A.

(2) Shri Udai Ram, M.L.A.

- (3) Shri Bhuwan Bhaskar Singh, M.L.A.
- (4) Shri Bhagwan Singh, M.L.A.
- (5) Shri Ved Ram, M.L.A.
- (6) Shri Kashi Prasad Pandey, M.L.A.
- (7) Shri Arjun Singh, M.L.A.
- (8) Shri Shyama Charan Shukla, M.L.A.
- (9) Shri Vrinda Sahai, M.L.A.

The notes are appended at the end of the report.

Acknowledgement.

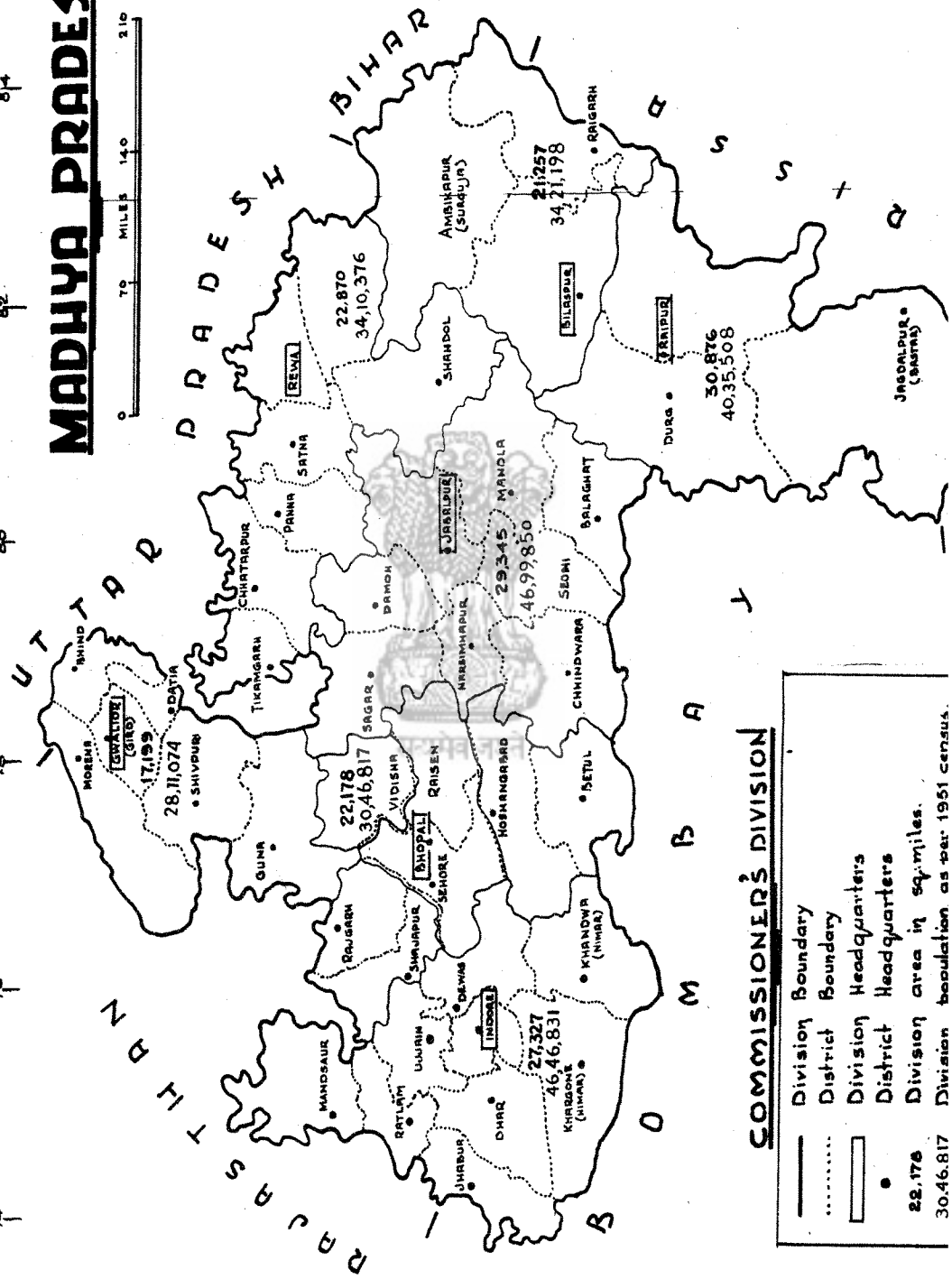
1.7 We should like to take this opportunity to express our thanks to the officers of the Union and State Governments, the members of Parliament and Legislative Assembly of the State, eminent public workers, farmers, managers of sugar factories, economists and other experts, who responded to our enquiry most ungrudgingly and offered their advice and views.

We are also grateful to Shri V. V. Ayachit, M.L.A., and Shri D. S. Sinha, Superintending Engineer, Minor Irrigation for offering their valuable suggestions and editing the draft report of the Committee.

Lastly, we wish to place on record our deep gratitude to Shri D. N. Khurana, I.S.E., Superintending Engineer, Mahanadi Circle, who had to put in hard work as Member Secretary of the Committee. His insight into the irrigation problems of the State, backed by long and mature experience of the Irrigation Department, made it possible for this Committee to prepare and present this exhaustive report.

We would be failing in our duty if we do not mention a word of thanks to the nucleus staff, headed by Shri M. M. Mahodaya, Assistant Engineer, assisted by Shri A. K. Thakur, Junior Engineer and Shri S. N. Sharma, Upper Division Clerk (1st Grade), who ably managed the secretarial functions of this Committee.

MADHYA PRADESH



COMMISSIONER'S DIVISION

- Division Boundary
- District Boundary
- Division Headquarters
- District Headquarters
- Division area in sq. miles.
- Division population as per 1931 census.

CHAPTER II.—TOPOGRAPHY, RAINFALL, SOILS AND PRINCIPAL CROPS IN RELATION TO IRRIGATION

I.—Topography

2.1 The State of Madhya Pradesh is situated in the centre of India and is the largest State of the Indian Union. It is situated between longitudes 74°-2' E to 84-2 E and latitudes 17°-48' N to 26°-52' N. It has an area of 1,71,200 square miles (4,43,750 square Km.). It is bounded by the States of Rajasthan, Uttar Pradesh, Bihar, Orrisa, Andhra Pradesh, Maharashtra and Gujrat in cyclic order. This new state was formed on November 1, 1956 by integration of several covenanted States *with the old Madhya Pradesh excepting Vidarbha.—

Introduction.

The important states were Gwalior, and Bhopal of the old Central India Agency, viz., Indore, Dhar, Jaora, Ratlam, Datia, Dewas (Junior), Dewas (Senior), Rewa of Baghelkhand Agency, Orchha of Bundelkhand Agency and Bastar, Jashpur, Kanker, Khairagarh, Nandgaon, Surguja and Raigarh of the Eastern Agency.

2.2 The State has been divided for administrative purposes into seven divisions, each under a Commissioner and 43 districts each under a Collector. The Divisional headquarters alongwith the districts under their administrative control, are shown in Appendix II-1. Still smaller units of administration are 196 tahsils, 751 revenue inspector circles and 14,180 patwari circles. These figures give an idea of the enormous size of the State and its administrative set up.

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*The merging states were—

(1) Bastar, (2) Chhambhakkhar, (3) Chhuikhaddan, (4) Jashpur, (5) Kanker, (6) Kawardha, (7) Khairagarh, (8) Korea, (9) Makrai, (10) Nandgaon, (11) Raigarh, (12) Sakti, (13) Sarangarh, (14) Surguja, (15) Udaipur, (16) Ajaigarh, (17) Alipura, (18) Baraundha, (19) Bijawar, (20) Chhatarpur, (21) Gourihar, (22) Jaso, (23) Kamta Rajaula, (24) (Kothi, (25) Lugasi, (26) Maihar, (27) Nagod, (28) Orchha, (29) Palde, (30) Panna, (31) Pabra, (32) Rewa, (33) Sohawal, (34) Charkhari, (35) Bhaissundha, (36) Gaurauli, (37) Naigawan Rebai, (38) Bhopal, (39) Taraon, (40) Alirajpur, (41) Barwani, (42) Datia, (43) Dewas (Senior), (44) Dewas (Junior), (45) Dhar, (46) Gwalior, (47) Indore, (48) Jamunia, (49) Jaora, (50) Jhabua, (51) Jobat, (52) Kathiawara, (53) Khaniadbanda, (54) Khilchipur, (55) Kurwai, (56) Mathwar, (57) Mohammadgarh, (58) Narsinghgarh, (59) Narmkhera, (60) Pathari, (61) Piproda, (62) Rajgarh, (63) Rajgarh (Bhumat), (64) Ratlam, (65) Sailana, (66) Sitamau, and (67) Samthar.

Political divisions

Population.

2.3 The population of the State according to the census of 1951 was 2.61 crores and it ranks seventh amongst the States of the Indian Union. The density of population is high around the industrial areas and in agriculturally advanced tracts, but is low in backward and forest areas.

Physical features.

2.4 The State can be broadly classified into six distinct physical regions as described below:—

(i) **Northern Low Lying Plains.**—This covers parts of Gwalior, Bhind and Morena districts and extends into Bundelkhand upto west of Panna range and includes certain parts of Rewa district between Panna Hills and Kaimur Hills of Baghelkhand. The elevation of this plain varies from 500-1000 ft. (152-305 m.) above sea level.

(ii) **The Malwa and Vindhyan Plateau.**—(a) *Malwa Plateau*—The table land of Malwa with average elevation of 1600 ft. (488 m) lies to the north of the Vindhyan barrier and to the South of the low-lying plains of Gwalior. It consists of large undulating plains of black cotton soil dotted with flat topped hills. Three branches of the Vindhyas extend north-ward in the form of detached hills; one branch passing through the districts of Bhopal (Raisen) Vidisha, Shivpuri and Datia, the second crosses Guna, Shivpuri and Morena districts, while the third goes through Dewas, Ujjain and Mandsaur Districts.

(b) *Vindhyan Plateau.*—The hilly Vindhyan Plateau is situated to the north of Narmada Valley and to the south of low-lying regions of Bundelkhand and Baghelkhand. It spreads from the east of Malwa Plateau to Maikal and Korea Hills of Satpura Range.

The water-shed of the two regions is determined by the main scarp of the Vindhyas and all streams run in the northerly direction. The most important rivers are Chambal and its tributaries, Kali Sind, Parbati, Sind and Kunwari, Betwa with its tributary Dhasan, Ken with its tributaries Sonar and Bearma all contributing to the catchment to Jamuna.

The other rivers are Tons and Son which contribute to the Ganga catchment.

(iii) **Narmada Valley.**—This is a long narrow valley stretching from Jabalpur in the east upto Barwani in West Nimar District. It is nearly 350 miles (563 Km) long and 30 miles (48 Km) wide and is walled in the north by the Vindhyan Range and in the south by the Satpura Range. It covers the districts of Jabalpur, Narsinghpur, Hoshangabad, Raisen, Sehore, East-Nimar, Dhar, Dewas and West Nimar.

(iv) **Satpura Stretch.**—It runs from west to east for about 400 miles (644 Km.) through the districts of East-Nimar, Betul, Chhindwara, Seoni, Mandla, Bilaspur and Surguja. Its northern spurs go into Hoshangabad and Narsinghpur districts and in the south the extensive spur of 100 miles (161 Km) covers the entire Balaghat district. General elevation of the ridge is 2000 ft. (610 M) but at places the peaks rise to more than 3500 ft. (1067 m).

From the northern slopes of the Satpuras flow the rivers Hiran, Sher, Shakkar, Tawa and Sukta to meet the Narmada, which ultimately flows into the Arabian Sea. From the southern slopes, Kanhan and Pench rivers flow and meet Wainganga river. Hasdeo river flows into Mahanadi which traverses in the easterly direction across the boundary of the State.

(v) **Chhattisgarh Plains.**—These extend along the eastern face of the Satpura Range and lie to the north of Bastar hills. A series of detached hills from the Bastar Plateau enter Raipur and Durg districts from the South. The drainage of Jonk, Pairi, Karoon and Sheonath rivers, from the northern slopes of these detached hills, flows into the Mahanadi. From southern slopes emerge the Indravati and Sabri rivers which are the tributaries of the Godavari.

(vi) **Bastar Plateau.**—The southern most part of the State is hilly and very much cut up. The tract lying to the north of Indravati river is plateau covered with forest and is 2000 ft. (610 m) above sea level on which are studded chains of hills about 500 ft. high (152 m) high. To the south of Indravati is the Bailadilla Range, which runs from north to south and spreads out in the south-east till it reaches

the Sabri river. The southern part lying along the bank of the Godavari river is low-lying.

2.5 From the point of view of irrigation the State can be divided into seven catchment basins of the principal rivers as shown in Appendix II-2 (The districts included in each basin are also given below):—

- (i) **Catchment of Ganga.**—This occupies the north-eastern part of the State and includes the districts of Surguja, Sidhi, Rewa, Satna and Shahdol. The drainage area is about 23,000 sq. miles. Tons and Son are the principal rivers. The terrain is mostly undulating with numerous small hills and streams. The lofty peaks of Amarkantak are 3,000 to 4,000 ft. (914 to 1,220 M) High. The average annual rainfall is between 48 to 56 inches. (1,219—1,422 mm). The crops grown are rice and seasamum.
- (ii) **Catchment of Jamuna.**—It lies to the north of Vindhyas, Bhandar and Panna Hills and drains the districts of Panna, Chhatarpur, Tikamgarh, Damoh, Sagar, Vidisha, Sehore, Raisen, Rajgarh, Shajapur, Ujjain, Dewas, Indore, Dhar, Jhabua, Mandasaur, Guna, Shivpuri, Gwalior, Morena, Bhind and Datia. The drainage area is about 53,000 sq. miles and the principal rivers are Chambal, Sind, Betwa, Dhasan and Ken. The average annual rainfall varies from 30 inches. (762 mm) in the north to 50 inches. (1,270 mm) in the south. The principal crops grown are wheat, jowar, cotton, groundnut and seasamum.
- (iii) **Catchment of Narmada.**—This is a long narrow stretch, walled on the north by Vindhyas and by Satpuras and Mahadeo hills in the south; the Maikal Hills are in the east and Asir Hills in the west. It covers the districts of Mandla, Jabalpur, Narsinghpur, Hoshangabad, East Nimar (Khandwa) and West Nimar (Kargone). The drainage area is about 34,000 sq. miles and the rivers are Hiran, Sher, Shakkar and Tawa, which drain the fertile Narmada Valley. The average annual rainfall varies from 20 inches. (508 mm) minimum in the West to 55 inches (1,397 mm) maximum in the east. This is predominantly a wheat growing area.
- (iv) **Catchment of Mahanadi.**—This lies to the south of Ganga and to the east of Narmada catchments. It covers the districts of Raigarh,

CATCHMENT AREAS

MILES

Bilaspur, Raipur and Durg. The drainage area is about 32,000 sq. miles which is very nearly equal to that of Narmada basin. The principal rivers are Sheonath, Jonk and Hasdeo draining the Chhatisgarh Plains. Average annual rainfall varies from 40 to 60 inches (1,016-1,524 mm) and above. The principal crops grown are rice and millets (Kodo-Kutki).

- (v) **Catchment of Godavari.**—This comprises of two detached basins of Wainganga and Indravati rivers. These principal tributaries of Godavari drain the districts of Balaghat, Seoni Chhindwara and Bastar, respectively. The drainage area is about 24,000 sq. miles. Average annual rainfall is 50-65 inches (1,270-1,650 mm). The principal crop is rice in the Wainganga valley and millets (Kodo-Kutki) in Bastar.
- (vi) **Catchment of Tapti.**—This is a small catchment and covers the districts of Betul and East Nimar. The average annual rainfall is between 30-40 inches (762-1,016 mm). The principal crops are Jowar, Groundnut and Cotton.
- (vii) **Catchment of Mahi.**—This is the smallest catchment and drains the districts of Jhabua, Dhar and Ratlam. The average annual rainfall varies from 30—35 inches (762-889 mm). The principal crops grown are, Jowar and groundnut. The total drainage area of Catchments of Tapti and Mahi is about 5,000 sq. miles.

2.6 It is observed that the principal rivers flow through narrow valleys and have numerous tributaries large and small meeting them generally at right angles. The Doabs are not very long. The streams are rain-fed, and carry huge discharge in the monsoon season and have very little flow during the dry months of the year. The main rivers and their major tributaries alone can be relied on for any appreciable dry weather flow.

2.7 The foregoing description of the State's topography leads to the conclusions that physical features are not in favour of extensive system of direct canals from rivers, but they are suitable for irrigation from storage works. Prior to the findings of the Indian Irrigation Commission (1902-03) the construction of large size irrigation works could not be taken up due to undependable river supplies and rolling nature of the country. With advancement in the technique of construction of high dams, the state offers excellent sites for storage reservoirs suitable for irrigation and power development. Conclusion.

II—Rainfall

Seasonal distribution of Rainfall.

2.9 Rainfall in the State presents great variety of meteorological conditions, actions and features. The monsoon usually breaks in the third or fourth week of June in different parts of the State. Months of heaviest rainfall are July and August. Monsoon starts receding from last week of September and complete cessation occurs generally by the middle of October. The percentages of total annual rainfall received during the five wet months (June, July, August, September and October), four winter months (November, December, January, and February) and three hot weather months (March, April and May) have been worked out for eight selected rain gauge stations of the State viz., Jagdalpur, Pendra, Raipur, Jabalpur, Satna, Bhopal, Indore and Gwalior and are given in Appendix III-1.

A comparison of the figures of total annual rainfall received at these stations shows great variation, e.g., the normal annual rainfall at Gwalior is 33.55 in. (857 mm) whereas at Jagdalpur it is as high as 57.54 in. (1462 mm). The distribution of rainfall in the State is given in Appendix II-3.

2.10 The south-west monsoon provides about 93 per cent of the total annual rainfall, while the area under Kharif crops is only 60 per cent of the total area sown. The overall agricultural production in any year is accordingly influenced by the area under kharif crop which in turn is influenced by the amount and distribution of monsoon. The post monsoon period extends from November to February, when only 4 per cent of total annual rainfall is received, which is important for the growth of rabi crops. During the hot weather months of March, April and May, only 3 per cent of annual rainfall is received. In the table below the percentage of the total annual rainfall received during different periods of the year in the State are compared with those for all India:—

Table

State or country	Mon- soon months	Post Mon- soon months	Hot weather months	Total
(1)	(2)	(3)	(4)	(5)
	per cent	per cent	per cent	per cent
Madhya Pradesh	93	4	3	100
All India	75	15	10	100

From the table above, it is clear that the distribution of rainfall during the three periods in the State is much divergent. The heavy rainfall in the monsoon season is followed by meagre rainfall in winter months and practically hot and rainless weather in summer. Comparing with the All India averages the distribution of rainfall in the State is much varied.

A vertical scale bar labeled "MILES" with markings at 0, 70, 140, and 210.



2.11 Great variation is noticed also in the amount of rainfall received from year to year. The rainfall records for the period 1939-40 to 1958-59 show that the maximum annual rainfall of 83.53 in. (2121 mm) was received at Raipur in the year 1947-48. While the lowest recorded rainfall of 13.90 (353 mm) occurred at Gwalior during the year 1941-42. The maximum, minimum and normal rainfalls for the selected rain gauge stations in the State are given in the table in descending order of the average annual rainfall :—

Rainfall variations
in the State.

Table

Station	Annual average Inches	Milli meters	Maximum		Minimum	
			Inches	Milli meters	nches	Milli meters
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Jagdalpur	63	(1600)	68.12	(1730)	13.90	(1166)
2. Jabalpur	58	(1473)	70.90	(1802)	34.33	(872)
3. Pendra	54	(1372)	77.23	(1975)	37.00	(939)
4. Bhopal	52	(1321)	70.76	(1997)	30.73	(781)
5. Raipur	52	(1321)	83.53	(2121)	39.52	(973)
6. Satna	45	(1143)	48.94	(1243)	28.60	(726)
7. Indore	35	(889)	61.29	(1556)	22.66	(559)
8. Gwalior	32	(813)	51.86	(1317)	13.90	(353)

The areas around Raipur, Pendra Road and Indore are subject to heavy rainfall and flood conditions while Jagdalpur, Jabalpur, Satna and Bhopal areas generally enjoy nearly normal conditions of rainfall. Areas around Gwalior are subject to severe drought conditions periodically.

2.12 Rainfall during the five wet months is a great determining factor for both kharif and rabi crops in the State. Analysis of the rainfall figures of the five wet months for the year 1939-40 to 1958-59 in the various parts of the State reveals, that in the districts of Hoshangabad, Narsingpur, Betul, Chhindwara, Seoni, Balaghat, Mandla, Jabalpur, Damoh, Sagar, Surguja, Raigarh, Bilaspur, Raipur, Durg and Bastar, average monsoon rainfall is between 50-53 in. (1270-1346 mm) (except for the district of East Nimar). In other regions of Madhya Pradesh average monsoon rainfall is much less. It ranges from 33.5 in. (851 mm) in Gwalior to 42.6 in. (1082 mm) in Bhopal. This indicates that in the districts of Mahakoshal except East Nimar if the average annual rainfall received were properly distributed, no supplemental irrigation would be necessary for rice crop. But, around Gwalior, Indore, Bhopal and Rewa centres irrigation is necessary for cultivation of rice crop. In the rest of the State other kharif crops, viz., Jowar, groundnut and sesamum thrive satisfactorily under rainfed condition.

Incidence of rain-
fall of various inte-
nsities for the wet
months

2.13 The characteristics of monsoons for the various parts in the State are determined yet in another manner. From the recorded data of rainfall, the precipitation probability of each class of rainfall, is determined. The daily rainfall has been classified and probable number of rainy days for each category of rainfall during the five wet months are calculated for each centre and given in Appendix III-2. The classes of rainfall listed are (i) 0-0.5 in. (0 to 12.7 mm) (ii) 0.5-1.0 in. (12.7-25.4 mm) (iii) 1.0-1.5 in. (25.4-38.1 mm) (iv) 1.5-2.0 in. (38.1-50.8 mm) (v) 2.0-2.5 in. (50.8-63.5 mm) (vi) 2.5-3.0 in. (63.5-76.2 mm) (vii) 3.0-3.5 in. (76.2-88.9 mm) and (viii) above 3.5 in. (88.9 mm). Out of these the total number of rainy days up to 2 in. (50.8 mm) daily rainfall *viz.*, categories (i) to (iv) are totalled while the higher precipitations are not considered useful for irrigation as rain water runs to waste. For the seven rainfall centres chosen it is observed that Indore leads as it has 73.4 number of days of rainfall up to 2 in. (50.8 mm). Mahakoshal region represented by the Jabalpur, Raipur and Bilaspur centres comes second. Bhopal centre receives useful rainfall for 59 days, Rewa for 53 days, Gwalior for 34.4 days during the 5 wet months. The necessity for irrigation for paddy crop is thus more in the areas around Gwalior, Rewa and Bhopal than in the Mahakoshal region and the areas around Indore centre.

Rainfall in the
month of september
and october.

2.14 The study of rainfall for five wet months would be incomplete without making detailed analysis of the characteristics of rainfall for the two crucial months during the growth of rice crop, *viz.*, September and October. Appendix III-3 gives data for these two months similar to that given in Appendix III-2. It will be seen that out of 61 days, the number of rainy days up to 2 in. (50.8 mm) daily rainfall are (i) Gwalior Centre—6 days (Least), (ii) Bhopal and Satna centres—13 days, (iii) Indore centre—16 days, (iv) Raipur Centre—18 days, and (v) Jagdalpur centre—29 days (highest). This again goes to confirm that irrigation of paddy crop is essential to make up the rainfall deficiency in the areas around Gwalior and Bhopal centres while in Vindhya Pradesh and in Malwa region (represented by Satna and Indore centre) the heavy soils preclude cultivation of the paddy crop due to difficulty of soil tillage.

In the districts of Mahakoshal except East Nimar cultivation of medium and late varieties of rice, which give good yield would still require irrigation inspite of 18 rainy days during September and October. In areas represented by Jagdalpur, rainfall is adequate for raising the early and medium varieties of rice.

Rainfall in the win-
ter months and tem-
perature condi-
tions.

2.15 Analysis of rainfall during the four winter months (November, December, January and February) which determines the out-turn of wheat crop in the northern and central districts of the State is given in Appendix III-4. The probability of precipitation are similarly worked out as

SHOWING RAINFALL OF CENTRAL PROVINCES (EAST) WEEK BY WEEK

(CHHATTISGARH TRACT)

[illegible]

Duration Of Continuous Spell in weeks	1	2	3	4	5	6	7	8
Frequency of normal spells.	140	60	33	22	12	12	9	6
Frequency of flood spells.	102	27	1	1	..	..	..	..
Frequency of drought spells.	126	60	19	15	8	3	2	1

REFERENCE :-

FLOODS [REDACTED]

NORMAL

DROUGHT ☐

above. The number of rainy days up to 2 in. (50.8 mm) daily rainfall are Pendra Road--9 days, Jabalpur--8.4 days, Satna--8.2 days, Bhopal--6.1 days, and Raipur--4.8 days.

Besides the rainfall average minimum temperature during November, December, January, February plays an important part during the flowering period of wheat crop. In Gwalior, Bhopal, Indore and Satna the minimum temperature is of the order of 50° F (10°C) which is sufficient to cause 'Mawat' (dew formation) with the humidity present in the atmosphere. At Raipur this temperature is comparatively higher, viz., 60°F (15.5° C). Due to this particular advantage of low temperature, during the growing season, yield of wheat is good in the areas represented by Gwalior, Bhopal, Indore and Satna centres.

2.16 So far the average probable rainfall during the whole year, monsoon, late monsoon and post-monsoon months have been analysed. The characteristics of rainfall in other aspects which effect agricultural production are further studied for a long term of 50 years by analysing the frequency of droughts and floods. In order to have a proper appraisal of the frequency of droughts in various regions of the State, four charts have been prepared and given in Appendix IV-1, 2, 3, 4. These show the normal drought, and heavy conditions of rainfall in the four regions drought and heavy conditions of rainfall in the four regions week by week from the year 1908-58. The abstract statement prepared from the study of these charts are given in Appendix III-5, 6, 7. Irregularities of rainfall.

2.17 From these statements irregularity of monsoon with regards to following three aspects is clearly brought out:—

- (a) Late commencement of monsoon ;
- (b) Early cessation of monsoon, and
- (c) Prolonged breaks during monsoon.

(i) The late commencement of monsoon occurs more frequently in the Vindhya Pradesh region while it is not so in the districts of Mahakoshal except East Nimar. Out of 50 years, 18 such years occurred in Vindhya Pradesh, whereas, in the districts of Raipur, Durg and Bilaspur only 5 such years were encountered.

(ii) The case of early cessation of monsoon is frequent throughout the State. Out of 50 years, 31 such years occurred in Vindhya Pradesh while in other parts of the State the number of such years was between 20 to 23. The Vindhya Pradesh region is thus more prone to kharif crop failures than other parts of the State.

(iii) For Kharif crops especially paddy, a prolonged break in monsoon reduces the yield considerably. Frequent recurrence of breaks in monsoon in the Madhya Bharat and Vindhya Pradesh regions are observed. Paddy crop is, therefore, not sown in that tract but, if irrigation

facilities are provided and rainfall deficiency met with, paddy can be grown. The recurrence of breaks in the monsoon during the period of 50 years was in 27 years in Madhya Bharat region, 20 years in Vindhya Pradesh region and 12-16 years in the districts of Mahakoshal (except east Nimar) and 12 years in Bhopal region. The necessity of irrigation in different regions is in the same order in which they are mentioned above.

Conclusion.

2.18 The normal rainfall in the State varies from 24-64 inches (610-1626 mm) and is usually sufficient for the crops grown in each region of State provided rainfall is well distributed. Irregularities in distribution however, indicate the necessity of irrigation all over the State. It is important to mention that the topography is undulating and soil textures are too much varied. These features combined with fluctuating rainfall make cultivators keen to resort to irrigation practices.

III.—Soil of Madhya Pradesh.

Methods of classification of soils.

2.19 In the science of agriculture, soil is defined as a mass of finely divided rock material containing decaying vegetable or animal matter. It forms the foundation upon which agriculture can be developed and it deserves special attention of farmers with regard to both selection of the farm and the manner in which it is to be cultivated and irrigated.

The soil classifications in Madhya Pradesh has been made from different considerations, according to the following methods :—

- (1) The land revenue assessment method,
- (2) Geological considerations,
- (3) By scientific studies of physical and chemical Properties of soil,
- (4) Classification in relation to vegetation, climate, topography, etc., and
- (5) Genetical consideration.

Whatever method is adopted, the object has been to determine natural land types which can be assigned definite ratings of productivity.

Scientific classification of soils.

2.20 The productivity rating of soils depends to a large extent on the availability of Nitrogen (N) Phosphorus (P205) and potas (K20) in the soil and also its PH value. The results of the soil samples obtained from a large number of districts of the State are given in Appendix III-8.

In the Indore Division, the soils are neutral in PH value, and are below average in Nitrogen, but have enough phosphorus and Potash. In the Gwalior Division also the percentage of neutral soils is very high, while the soils are

much deficient in nitrogen and phosphorus. In the Bhopal region, neutral soils abound, while they are low in nitrogen and phosphorus. In Raipur Division, the soils are acidic and are low in nitrogen and phosphorus. In Jabalpur Division the soils are neutral having good phosphorus with low nitrogen. In Bilaspur Division the soils are neutral and low in nitrogen and phosphorus.

2.21 In order to assess the index rating of soils in each district of Madhya Pradesh, a reference was made to Dr. S. P. Raychaudhari, Chief Soil Survey Officer, Indian Agricultural Research Institute, New Delhi. According to him the main soil types of Madhya Pradesh are— Index rating of soils.

- (i) The fertile alluvial soil well supplied with potash, lime but poor in phosphoric acid;
- (ii) The deep black soil which is very good for wheat and a variety of other crops;
- (iii) Medium black soil, which is not very deep, is suitable for most of the crops ;
- (iv) Shallow black soil which consists of shallow loams having a clay percentage of 15 to 30 % ;
- (v) Mixed red and black soil, the characteristics of which are light texture, absence of lime concretions, and free carbonates. It is generally deficient in nitrogen, phosphoric acid, organic matter and lime ;
- (vi) Red and yellow soil. This is mostly suited for the rice crop. The soil is generally light and sandy, though medium and heavy varieties are also found ;
- (vii) Skeletal or gravelly soil which is generally poor, though some patches of good black soils are also met with, where crops like rice, wheat, etc., are grown.

2.22 Based on a modification of the storie' system the index rating of soils of Madhya Pradesh has been prepared. The storie Index for rating the value of soil is a numerical expression of the degree to which a particular soil presents condition favourable to plant growth, under good environmental conditions. In this rating three factors are considered.

Factor A.—Regarding character of the soil profile as revealed by—

- (1) Permeability ;
- (2) Degree of weathering ; and
- (3) Natural fertility ; etc.

Factor B.—Regarding topography, texture and structure of soil.

- Factor C.**—(1) Regarding Degree of climatic suitability ;
 (2) Salinity ;
 (3) Stoniness ; and
 (4) Tendency to erode.

Each of these factors is evaluated on the basis of 100 per cent for the most favourable conditions. The soil index rating is the product-A by B by C. This final index is expressed as a percentage.

2.23 The soils have been given the following percentage ratings for the three factors according to the types of soils :—

Factor A.— Rating in percentage.

- | | |
|---|-----------|
| (1) Unweathered or slightly weathered secondary soils. | .. 95—100 |
| (2) Moderately weathered secondary soils. | .. 80—95 |
| (3) Thoroughly weathered secondary soils with dense clay sub-soils developed on unconsolidated parent material. | .. 40—80 |

Factor B.—

- | | |
|----------------------------|-----------|
| (1) Topography | .. 65—95 |
| (2) Medium textured soil | .. 80—100 |
| (3) Medium heavy textured | .. 80—90 |
| (4) Heavy textured | .. 50—70 |
| (5) Light textured | .. 60—80 |
| (6) Gravelly and stoniness | .. 35—70 |

Factor C.—

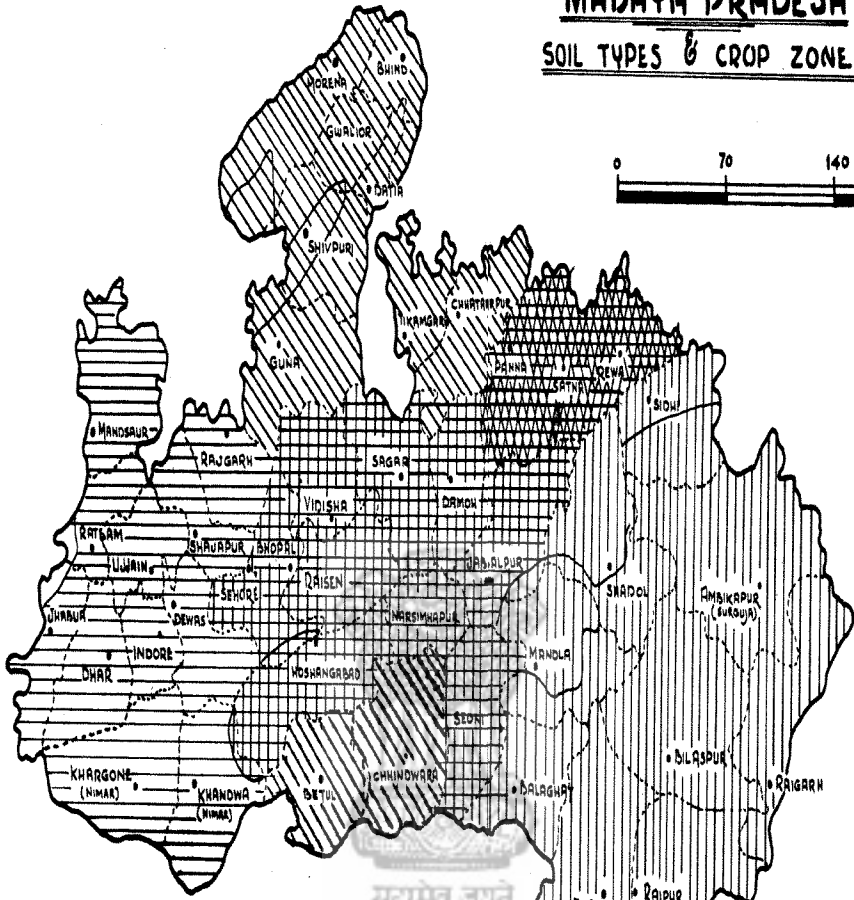
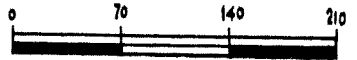
- | | |
|---|-----------|
| (1) Climatic suitability with rainfall, temperature, etc. | .. 60—95 |
| (2) Drainage (fair to well) | .. 70—100 |
| (3) Moderately water-logged | .. 40—70 |
| (4) Badly water-logged | .. 10—40 |
| (5) Alkalinity (with degree) | .. 50—100 |
| (6) Strongly affected | .. 5—25 |
| (7) Acidity (according to degree) | ... 60—95 |

The average index rating of productivity of soils as calculated by the above-mentioned is given districtwise in Appendix III-8.

A bar-chart of indices is prepared and given in Appendix IV-5. The indices are plotted in descending order. It may be observed that the average productivity rating for the State is 53.18.

MADHYA PRADESH

SOIL TYPES & CROP ZONES

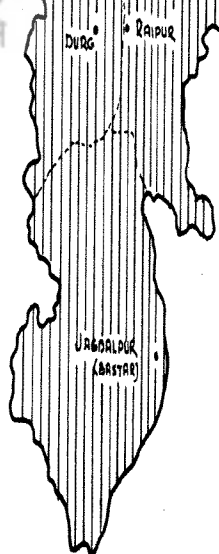


— SOIL TYPES —

	ALLUVIAL SOIL
	DEEP BLACK SOIL
	MEDIUM BLACK SOIL
	LIGHT BLACK SOIL
	RED AND YELLOW SOIL
	MIXED RED AND BLACK SOIL
	GRAVELLY

— CROP ZONES —

	RICE ZONE
	WHEAT ZONE
	WHEAT RICE ZONE
	JAWAR WHEAT ZONE
	JAWAR COTTON ZONE
	JAWAR ZONE

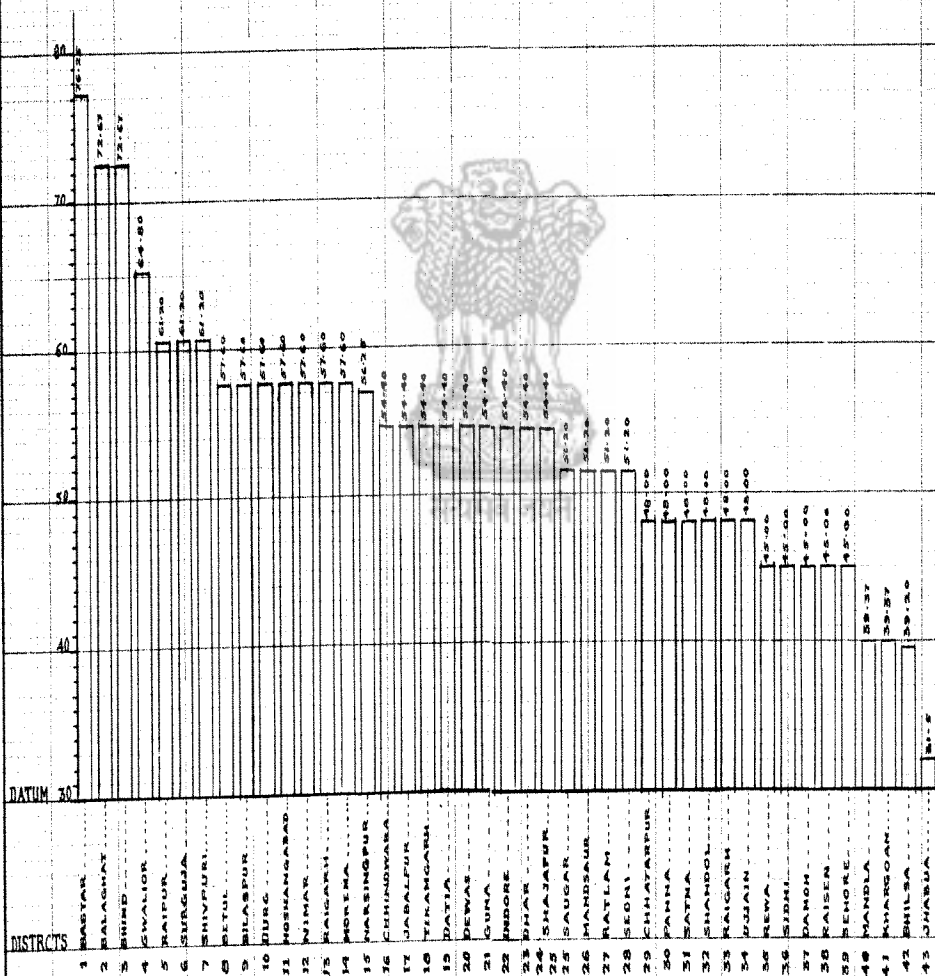


Travelling

INDEX RATING OF SOIL FERTILITY

OF
MADHYA PRADSH

DISTRICT WISE



2.24 The State of Madhya Pradesh can be sub-divided broadly into seven soil zones and six crop zones as described below and are given in a map in Appendix II-4.

(1) Rice Zone

2.25 This covers the districts of Bastar, Raipur, Bilaspur, Durg, Balaghat, Surguja, Raigarh, Mandla, Sidhi and Shahdol. The soil of this zone is mostly red and yellow with four main representative sub-divisions. Principal crop zones.

(i) In the districts of Raipur, Durg and Bilaspur the main soils are, Kanhar, Dorsa, Matasi and Bhata. Kanhar soil is a clayey soil containing about 43.4 to 56.5 per cent clay and only 16 to 20 per cent sand. It is similar in character to Kabar and contains large amount of Kankar. This is the best soil for wheat but it is also fairly good for rice. Dorsa I and II contain 37 to 44 per cent clay, 26 to 29 per cent silt and nearly 24 to 31 per cent sand. Actually Dorsa is a mixture of Kanhar and Matasi and is the best soil for rice. Matasi is a sandy loam containing about 40 to 41 per cent sand and 18 to 29 per cent clay. It is yellow soil with many varieties. The soil after manuring and cultivation gives good rice crop. Bhata is the poorest soil of the tract. It is red, full of stones and has no consistency. It can grow only kodo or til. Pal kachhar and patpar kachhar consist of silts found on the bank of rivers. Pal kachhar is a garden soil and Patpar Kachhar is a sandy soil.

The index ratings of the soils districtwise are
(1) Bastar—76.95; (2) Raipur—61.2; (3) Surguja—61.8;
(4) Bilaspur—57.6; (5) Durg—57.6; (6) Raigarh—57.6.

(ii) In Balaghat district, for several miles on either side of Wainganga, Bagh, Deo and other big rivers, the soil is rich black formed by the alluvium brought down by these rivers. On the Western side of Wainganga, the soils are also black but resemble more closely the soils in the Chhattisgarh Plains. From a number of rice soils analysed it is seen that clay varies from 13.0 to 30.0 per cent in a 6 inch (152 mm) surface layer while sand varies from 88.7 to 80.2 per cent. The soils below the surface layer have higher clay contents which varies from 20 to 46.5 per cent. Index rating of soil for Balaghat district is very high, i.e., 72.67.

(iii) In Mandla district the prevailing soil is Barra, which is a gravelly soil and very poor in character and can grow only lesser millets or oil seeds. In Mandla tahsil black soil of varying depth and quantity is met with. The index rating of soil for Mandla district is 39.37.

(iv) In the districts of Sidhi and Shahdol of Baghelkhand the soils are Sigon and Domat. Sigon is a clayey and rice growing soil. Domat is dark coloured and is a mixture of Sigon and black soil called Mair. In the south Sigon soil of a lighter texture (locally called sehra) predominates. In fact light and sandy soils constitute major portion of land in the south and east of Baghelkhand

Damat and Mar soils are only found in small patches. Poor and gravelly soil in the north and stony sandy soil in the south are "refuse" soils and are locally known as Bhata, Bagar or Bharra. Kachhar is alluvial soil and is found in the vicinity of the Son and other rivers. The index rating of the soil for Sidhi district is 45 and that for Shahdol district 48.

(2) Wheat Zone

2.26 This covers the districts of Jabalpur, Seoni, Hoshangabad, Narsinghpur, Sehore, Raisen, Vidisha, Sagar and Damoh. The soil of the Wheat Zone is black soil of varying depth with the following two main representative subdivisions:—

(i) **Narmada Valley.**—In Hoshangabad district the soils fall into five categories (a) black; (b) dark brown; (c) coarse brown; (d) mixed; and (e) sandy. Black soils include Maryar and Kabar. The difference between the two is that Kabar is harder to work on than Maryar and exploitation of the former depends upon timely rainfall. Maryar is essentially a wheat soil, while karbar grows variety of crops. Dark brown soils include Morand I and II and Kanhar I, Rankar being a poor soil is used for growing grass. Coarse brown mixed and sandy soils are poor soils. Mixed soil includes Domatta I and II. They are the mixtures of sand and good soil. Clay in these soils varies from 21.2 to 57.5 per cent. The index rating of this soil is 57.6.

In the districts of Sagar, Damoh and Jabalpur, shallow black clayey soils are generally found, however, the soil in Narsinghpur district is deep black soil. In these districts the typical soils are Mund I and Mund II, Mar, Kabar, Domatto, Sehra, Rathia, Rayan (Raiyan), Patarua and Bhattuas. The black soils like Mar, Kabar, Mund and Rayan I together cover major part of the occupied area. Mund I is a typical wheat soil with good depth. Mar is a superior quality of Mund and occurs extensively in parts of the Khurai Plains. Mund II is a shallow soil. It does not grow wheat continuously but it does so in rotation of jowar, gram and other leguminous crops. On alluvial/flat or where it is mixed with a heavier soil, Mund II forms a good kharif land. Domatta and Sehra soils are mostly used for rice. Rathia is a fine soil for kharif, but difficult for rabi. Under favourable conditions Kabar will grow a luxurious crop of wheat, but the soil is too heavy and sticky. The black Rayan or trap soil is more often shallow. The Patarua II and Bhattuas are light black soils used principally for inferior millets or as pasture lands. In Damoh district Mund is the prevailing soil so also in the Haveli tract and becomes steadily poorer as the junction of the Sonar and Bearma rivers is approached. Kabar is plentiful in Battisgarh group where the finest rabi is grown. Rathia, a silty soil, abounds in the valley of the Bearma, while Patarua is in the hilly tract. Analytically these soils can be divided into three types, *viz.*, clayey; Loamy; and Sandy. The

clayey soils contain 43 per cent clay and are known as heavy black wheat soils. Loamy soils have clay between 19.6 to 37.4 per cent and sand between 32.9 to 48.6 per cent. Sandy soils have clay percentage varying between 59.3 to 84.89. Index rating of soils are 51.2 for Sagar, 54.4 for Damoh and Jabalpur and 56.25 for Narsinghpur.

(ii) Sehore, Raisen and Vidisha districts have the soil conditions akin to the Malwa Plateau. The soil classes, are Kali (black cotton soil); Khardi; and Halki. The latter two are light soils with greater proportion of sand. There are various grades of Kali and other soils, the local names slightly vary in different districts. Accordingly as the soil is irrigated or not it is called "Adan" or "Barani". The fallow land is classed as Padat and Charani (grazing land). Land unfit for cultivation is called "Kharab". The Index ratings of soils districtwise are Sehore 45, Raisen 45, and Vidisha 39.2.

(3) Wheat-Rice Zone

2.27 This covers the districts of Rewa, Satna and Panna of Baghelkhand. The soil of this tract is red and black. In Satna district the alluvial soil in the Son river Valley grows rice. There are six main soil classes, viz. Gattar; Domat; Sigon; Mair; Patarua; and Bhata. The index rating of the soils districtwise are 45.0 for Rewa; 48.0 for Satna; and 48.0 for Panna. No analytical data about these soils is available.

(4) Wheat-Jowar Zone

2.28 This covers the districts of Gwalior, Bhind, Morena, Shivpuri, Guna, Datia, Tikamgarh and Chhattarpur in the north and Chhindwara and Betul in the south. It has got four principal sub-divisions:—

(i) In the northern low-lying region of Bhind, Morena and Gwalior districts soil is alluvial. The main soil classes are Mar, Kabar, Padua, Dumat and Rankad. Mar is black cotton soil rich dark and friable, retentive of moisture and is clayey; it produces good crop of wheat without irrigation. Kabar is less dark and is clayey than Mar but stiffer in structure. Padua is a light soil of yellowish colour and is easy to work on. It produces good crop of wheat under irrigation. Rankad is a shallow gravelly red soil of poor quality and is generally infertile. It produces cheap crop of Baira and Jowar year after year and has to be sown or twice in three years. Dis-

of moisture (gram mixed) and difficult to work structure it produces of great depth and is of kharif crops and grows as a shallow gravelly red (Peb- of til (sesamum) and in- can not grow crops left fallow once in two years index rating of the

fertility. The principal soil class are the same as above. The index rating of soils are 54.4 for Datia and Tikamgarh districts and 48.0 for Chhattarpur district.

(iii) In the districts of Guna and Shivpuri, the soil is medium black on trap similar to that of Malwa. The chief soil classes are Mar, Kabar, Domat, Kali, Padua and Rankad. The index rating of soils are—54.4 for Guna district and 61.2 for Shivpuri district.

(iv) In the districts of Chhindwara and Betul the soils are shallow clay-loam. The various classes of soils are—(1) Kali; (2) Morand; (3) Mutburra (Khardi); (4) Bardi; and (5) Sihar. The percentage of clay varies from 14.9 to 29.0 and of sand from 16.9 to 53.75. The index rating of the soil is 54.4 for Chhindwara district and 57.6 for Betul district.

(5) Cotton-Jowar Zone

2.29 This covers the districts of Mandsaur, Ratlam, Jhabua, Indore, Ujjain, Dewas, Shajapur, Rajgarh, Dhar, East Nimar and West Nimar. The soil of this region is medium black soil. It has two principal sub-divisions:—

(i) **Malwa Plateau.**—The high lands of Malwa consists of large undulating plains of the famous black cotton soil. The chief classes of soils are—Kali I, II and III; Khardi and Halki which grow excellent crop of jowar and cotton. Districtwise index ratings of soils are—51.2 for Mandsaur, 54.4 for Ratlam and Shajapur; 48.6 for Ujjain; 31.5 for Jhabua; 54.4 for Indore, Dewas and Dhar; and 48.0 for Rajgarh.

(ii) In the districts of West Nimar soil is typical of the Malwa tract, but in East Nimar, seven classes of soils are found, *viz.*, Kabar II; Morand I; Morand II; Rankar; Kheri I; Kheri II; and Barra. Rankad is a light soil containing large portion of lime stone, pebbles and sand. Barra is a stony land incapable of growing any crop whatsoever. The index ratings of the soils are 39.37 for West Nimar; and 57.6 for East Nimar.

Conclusion.—

2.30 The productivity index rating of soils depends on various factors as explained in para 2.23. It is also a common observation that soils in a district vary considerably not only on texture but also on fertility. Consideration for working out of the indices which are given in paras 2.21 to 2.29 and are summarised below:—

Name of districts

Productivity index ratings.

(2)

- | | |
|--|----------------|
| (1) | (2) |
| (b) Betul, Bilaspur, Durg, Hoshangabad, Nimar, Raigarh, Morena, Narsinghpur, Chhindwara, Jabalpur, Tikamgarh, Datia, Dewas, Guna, Indore, Dhar, Shajapur, Sehore, Bhilsa, Ujjain and Raisen. | Above average. |
| (c) Sagar, Mandsaur, Ratlam, Seoni, Chhattarpur, Panna, Satna, Shahdol, Rajgarh and Ujjain. | Below average. |
| (d) Rewa, Sidhi, Damoh, Raisen, Sehore, Vidisha, Mandla, Khargone. | Poor. |
| (e) Jhabua. | Very poor. |

IV.—Principal crops of Madhya Pradesh.

The principal crops sown in Madhya Pradesh in order of their acreage are rice, wheat, jowar, gram, kodo-kutki, cotton, maize, urad, linseed, tur, groundnut, sesamum, mung, bajra, masur, barley, rape and mustard. They together cover 93.9 per cent of the total cropped area of the State. Irrigation in Madhya Pradesh is practised on a small scale. The total irrigated area was only 6.0 percent of the total cropped area in 1957-58. The only crops which are irrigated to any appreciable extent are rice, wheat, sugarcane, fruits and vegetables and they account for 84.6 per cent of the total irrigated area. The total and irrigated areas under the main irrigated crops in 1957-58 were as follows:—

Crop	Total area under the crop 1957-58	Area irrigated 1957-58	Total area under the crop 1957-58	Area irrigated 1957-58	Irrigated area as per cent of the total area under crop
(1)	(2)	(3)	(4)	(5)	(6)
	Area in Acres		Area in Hectares		
Rice	96,90,411	14,73,682	39,21,574	5,96,378	15.21
Wheat	62,87,480	4,08,513	25,44,455	1,65,319	6.50
Jowar	48,74,279	358	19,72,552	145	Negligible.
Cotton	19,82,710	8,521	8,02,375	3,448	0.43
Sugarcane	1,15,524	1,09,196	46,751	44,190	94.52
Groundnut	9,17,996	275	3,71,500	111	0.03
Vegetable & Fruits	2,40,604	98,249	97,369	39,790	40.83
Others	1,68,63,283	3,71,392	68,24,335	1,50,069	2.70
Total	4,09,72,287	24,70,186	1,65,80,911	9,99,450	6.02

The details of sources of irrigation from which the areas are irrigated are shown in Appendix III-9.

2.33 Details of cropping of important crops are given in the following sub-paras. Charts at Appendix IV-6 & 7 depict the areas and production of each crop for the year 1957-58.

(i) **Rice.**—The State contributes about 2.1 million tons (2.135 million metric tonnes) which is nearly 8.4 per cent of the total rice production in India. Autumn rice is generally grown in the State due to favourable conditions of rainfall. Winter and summer rice are not grown worth the name due to want of perennial irrigation. Considering the distribution of its area in the State, more than about three-fourth of rice area is in the ten districts of Raipur, Bilaspur, Durg, Bastar, Raigarh, Surguja, Mandla, Balaghat, Shahdol, and Sidhi. Rice cultivation in the State is thus in a defined contiguous area, *i.e.*, the south-eastern part of the State comprising of the Chhattisgarh Plains, Wainganga valley and the adjoining districts of the Vindhya Pradesh Region. The percentage of rice area irrigated was 15.2 of the cropped area in 1957-58.

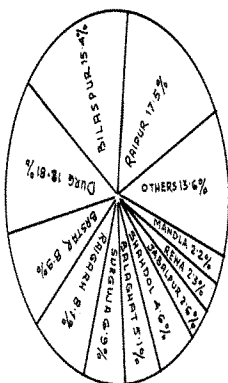
(ii) **Wheat.**—The second important staple food-crop grown in the State is wheat which yields 1.1 million tons (1.12 million metric tonnes) *i.e.*, 14.2 per cent of the total production in India. Mostly this crop is grown under rain-fed conditions in the retentive soils of the Malwa Plateau, in the tank beds of the erstwhile Gwalior State and in the alluvial valley of Narmada. The total wheat area in the State is scattered over a larger number of districts than the area under rice and jowar. The principal wheat growing districts are Sagar, Vidisha, Sehore, Hoshangabad, Narsinghpur, Raisen, Jabalpur, Seoni and Damoh. The percentage of wheat area irrigated was 6.5 of the cropped area in 1957-58.

(iii) **Jowar.**—This crop is extensively grown under rainfed conditions and no irrigation is required except for rabi Jowar namely Rengani and Dadar. Its production in the State was 1.2 million tons (1.22 million metric tonnes) which was 14.5 per cent of the All-India produce. Similar to rice, the cultivation of jowar is concentrated in only about one-third of the districts of the State, *viz.*, West Nimar, Mandsaur, Betul, Shajapur, Ujjain, Raigarh, East Nimar, Dewas, Ratlam, Dhar, Jhabua and Indore. The major rice growing districts are entirely different from the major jowar growing districts.

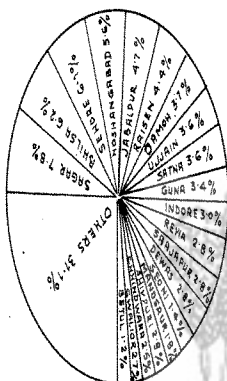
(iv) **Sugarcane.**—As compared to other crops the production of sugarcane in the State is small. The State produces only 125 thousand tons (127 thousand metric tonnes) of gur which forms nearly two per cent of the All-India production. The low yield of the commodity is due to the fact that sugarcane crop is a perennial crop for which permanent sources of irrigation are essential which are not

AREA SOWN UNDER CROPS 1957-1958 IN M.P.

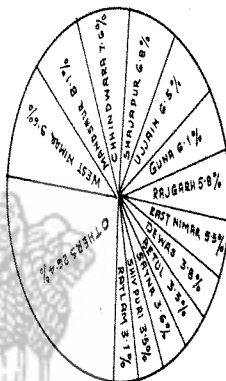
RICE



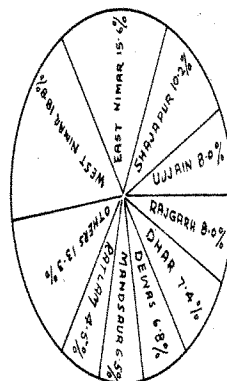
WHEAT



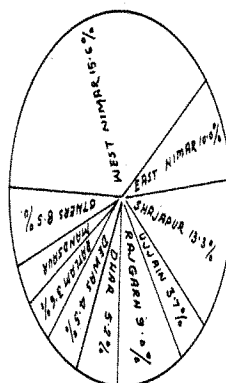
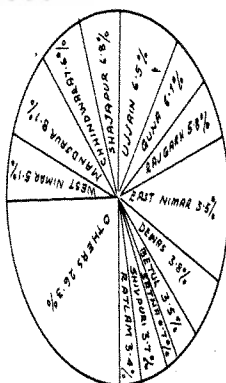
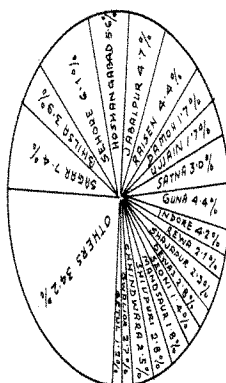
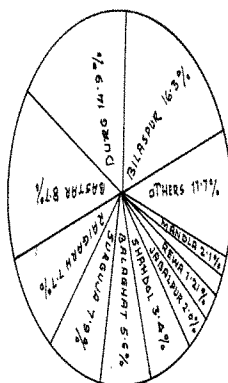
JUAR



COTTON



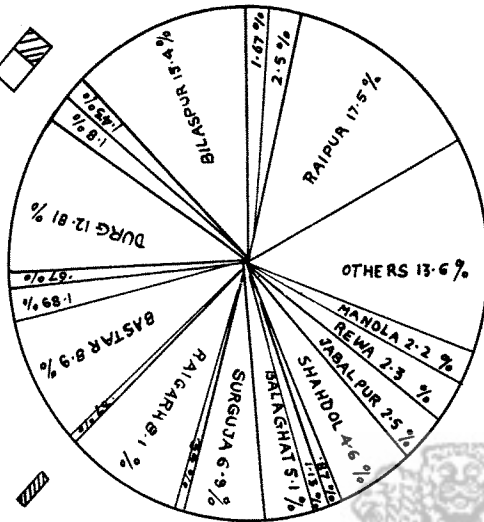
PRODUCTION OF CROPS IN THE YEAR 1957-1958



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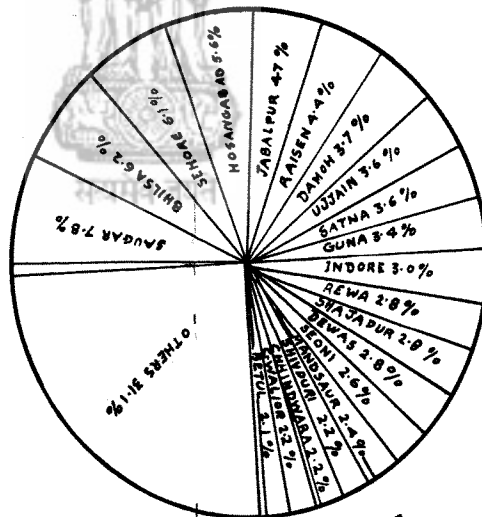
Irrigated by Govt. Sources.

— do — Private Sources



WHEAT

AREA



available all-over the State. It is, therefore, generally grown in those districts where the ground-water table is high and water can be lifted from wells.

In the districts of Gwalior, Shivpuri, Tikamgarh, Sehore, Balaghat and Bilaspur the crop is irrigated from canals, tanks and wells. While in other districts it is chiefly irrigated from wells. Acreage under the crop in descending order is contributed by Gwalior, Sehore, Morena, Shivpuri, Ratlam, Mandsaur, Tikamgarh, Betul, Chhindwara, Rajgarh, Shajapur, Guna, Ujjain, Dewas, Indore, Bilaspur, Balaghat, Raigarh, Chhatarpur and Dhar Districts.

(v) **Cotton.**—This crop is grown in the districts of West Nimar, East Nimar, Shajapur, Ujjain, Rajgarh, Dhar, Dewas, Mandsaur, Ratlm, Jhabua, Hoshangabad, Indore, Sehore, Chhindwara and Betul. The yearly production varies around the average of 4,64,000 bales of 392 lbs. (178.4 kgm.) each and this forms 9.75 per cent of the All-India produce. It is generally not irrigated in the State. The varieties grown are American (Buri), H 420, Jarialla; Oomras and Malvi. Average yield of the crop is comparatively higher in West Nimar, East Nimar and Shajapur than in other districts.

(vi) **Linseed.**—Linseed is grown as a cash crop in the districts where rice is grown. This crop is not irrigated and is grown mostly in the rice fields, in order to utilise the moisture content left over at the time of maturity of the rice crop. The estimated yield in 1957-58 was 77,000 tons (78,309 metric tonnes) of linseed, which formed 28.4 per cent of All-India produce.

(vii) **Sesamum.**—Sesamum crop is an important oil-seed crop and is not irrigated. In 1957-58 yield of this crop was 44,000 tons (44,748 metric tonnes) which is 12.1 per cent of All-India production.

(viii) **Groundnut.**—The produce of groundnut was 19,900 tons (20,230 metric tonnes) i.e., 4.57 per cent of All-India produce. The crop is not irrigated.

CHAPTER III.—HISTORY OF DEVELOPMENT OF IRRIGATION IN MADHYA PRADESH

Irrigation in India
in ancient times.

3.1 From the dawn of civilisation, India has been primarily an agricultural country. There are numerous reference to dams, canals, tanks and wells in the vedas. The Rigveda mentions the term "Avata" which signifies a well. In "Yajurveda", mention is made of canals, and dams. They are termed "Kulya" and "Sarsee", respectively. Ramayan also mentions about the gigantic feat of King Bhagirath in diverting the course of the waters of the sacred Ganga from the altitudes of the Himalayas towards the present Indo-Gangetic plain.

तृच गंगावतरणं त्वया कृतमरिन्दम्.

अनेन च भवान् प्राप्तो धर्मं स्यातन महत्॥ १३-३४ आदि रामायणम्

The great virtue of making tanks, wells, etc., for the inhabitants of the place was religiously sanctioned.

चतुर्वर्गमहीदानं जन्म फलं सन् फलं प्राप्तिकाम. (श्री विष्णु प्रीतिकामोवा)

इमं जलपूर्णां पुष्करिणीं जलाशयं ब्रह्म देवतं सर्वभूतेभ्यो हमुत्सृजे.

ॐ देवपितृमनुष्याः प्रीयन्ताम्.

सर्वभूतेभ्य उत्सृष्टं मये तज्जलमर्ज्जितम्.

रमन्तु सर्वभूतानि स्नानपानाद्यगाहनैः.

सामान्यं सर्वभूतेभ्यो मया दत्तमिदं जलम्.

रमन्तु सर्वभूतानि स्नानपानाद्यगाहनैः.

and this is being done even to-day.

Megasthenese, the Greek Ambassador at the Court of Chandragupta wrote an account of India in 300 B. C. and stated that "The whole country was under irrigation and was very prosperous". History also mentions about the construction of the big lake Sudarshana in Kathiwarra in the first century A.D. Similar works in South India were the Grand Anicut, the Parameshwara Tataka and Kaveripakkam tank and Golavaridhi tanks which were constructed between the 1st and 10th century A.D.

Tanks in Vindhya
Pradesh.

(i) The Chandela King Yeshovarman (B. C. 125—50 A. D.) is credited with the excavation of a large tank called (बिल्व तड़ाग) and construction of the largest Vaishnava temple (now called Lakshmana temple) at Khajuraho (according to the Khajuraho Stone inscription of King Dhvaga dated 1002 A.D.) The Bilva Tank, which is said to rival the sea, may be identified with the present Sibasagar which is quite close to the Lakshmana Temple.

स्पर्धा वानधिकं व्यधत्त जलधदेत्वे तड़ागान्वबभूव

The well known traveller Ibn Battuta who visited Khajuraho in A.D. 1335 calls the place as "Kajarra" where there is a great pond, about a mile in length, near which are temples containing idols which the Muslims have mutilated. In the centre of that pond there are 3 cupolas of red stone each of 3 storeys, and at the four corners of the pond other cupolas have been constructed.

(ii) According to the Chandrehe stone inscription dated 937 A.D. Prabodhasiva, a well known Saiva Pasupata teacher, excavated a Tank resembling the sea by the side of the hill and built a Saiva monastery near the Siva Temple constructed by his teacher.

अनुगिरमथो सिन्धुप्रख्यं तडागमर्चयन् प्रबोध शिवःशमीम् ।

(iii) The Rewa Stone inscription of Kalachuri Vijaya Sinha dated 1193 A.D. states that Malayasinha hereditary minister of the Kalachuri, built a large tank वप्रैःससर्जार्धि सरोय ईःक at a cost of 1500 tank. A special officer was appointed as Superintendent of tank to look after the tank which is described in a highly romantic strain.

एतदम्भोनिधानाय शतानि दशपंच च
भगवन्मुद्रया योपी टंककाना व्ययेज्जरोत् ॥
तासां भुवो ड्डानि कुचोरुजं वा दृष्टवान् सूत्राण्य पतन्मुनीनाम् ॥

(iv) A tank called बल्लभ-सागर with a pleasure house Old tanks in Bilaspur. (विलास वेद्य) within, was built by Vallabharaja a feudatory Chief of the Kalachuri King Ratnadeva II (1120-35 A.D.) at Kotgarh near Akaltara in Bilaspur District (according to the Akaltara stone inscription of Ratnadeva II).

इहोण बाह्यालि विलासवेदमनो विचित्रकर्मोन्ततमूतमं धनैः ।
उन्नीखनच्चारु सरोजराजितंसच त्रिलोकीमुकूर सरोवरम् ॥

(v) A large tank and a Siva Temple were built at Ratnapura by Purushettama, a minister of Ratnadeva II according to the "KONTI" (District Bilaspur) (Stone inscription of Prithvideva II dated 1148 A.D.)

गम्भीरं च बहुसत्वं निर्मलमतिशोभन जनैः सेव्यम्,
हृदयमिव स्वकमकरोद् रत्नपुरे सागरं यच्च ॥

(vi) According to the Ratnpur Stone inscription of Prithvideva II dated 1158 A. D Vallabharaja made a lake to the east of Ratanpura, using the range of hills near the village Khada as a dam. रत्नपुरात पूर्वं खाडा ग्राम समीप पर्वत बन्धयित्वा सरोवरं निर्मितं He also built several tanks in the vicinity and excavated a large lake रत्नेश्वरसागर named after Ratnadeva II. Khada is modern Karra near which exists the extensive Kharang tank (About 1½ miles east of Ratnapur).

(vii) Brahmandeva, another feudatory chief of Kalachuri Prithvideva II built number of temples and tanks at and near Ratnapura which are enumerated in the Ratanpur stone inscription of Prithvideva II dated 1163 A.D. He excavated a tank at Mallala, which is same as Mallal, 16 miles south east of Bilaspur. Near about. he dug two lotus ponds. At Ratnapura he excavated two beautiful tanks, besides a five stepped well वापाङ्ककार रुचिरां विचित्रसोपानाम्

(viii) He also dug picturesque tanks at Bamhani (4 miles north east of Akaltara) and three other neighbouring villages.

(ix) The Sheorinarayan stone inscription of Jajalla-deva II dated, 1167 A.D. testifies to the excavation of splendid tanks at (पण्डरतलाई) (modern Pondvia) which is 7 miles north west of Sheorinarayan and Patharia villages of the same name six miles south-east of Mungeli by Amnadeva Rajadeva feudatory chiefs, respectively.

(x) According to the Kharod stone inscription of Ratnadeva III dated 1181 A.D., his minister Gangadhara had fine tanks and lotus lakes excavated at (तिपूङ्ग) (modern Tipung) 10 miles south of Kharoda at गिरदुली (modern Girolpali in Janjgir Tahsil), उलुबा (modern Ulba in Raipur District) and सेणाडु (modern Sorada, 15 miles east of Kharoda).

Tanks in Dhar.

(xi) Tanks traditionally known as मूञ्जसागर after the famous Paramara King (B. C. 970-100 A. D.) exists at Dhar, Mandu and Ujjain which were the most important cities under the Paramara Rulers. The Gandhawari copper plate of Munja dated, in 974 A.D. also refers to a शिवतडाग at Ujjain and a tank called पिप्परिका at Gardabhpaniya (Modern Gandhwani in District Dhar).

3.2 Amongst the irrigation works of the early past, a mention should be made about the Bhojpur lake, 20 miles south of the city of Bhopal. This marvellous lake was constructed in the 11th century A. D. by Raja Bhoj of Dhar. Due to its large water-spread, there is local saying that "Tal ho to Bhopal Tal, Sub Dusre Talaiya". W. Kincaid observed in December, 1818 that, this marvellous lake was 250 square miles in area. The great Bhojpur lake was without doubt the largest and most beautiful sheet of fresh water. It covered a valley which presented the most remarkable feature. Though it was so extensive, only two breaks occurred in its wall of hills, one a little more than one hundred yards, the other about five hundred yards wide. Both of them were spanned by very remarkable dams, consisting of an earthen central bund faced on both sides (outer and inner) with immense blocks of stone laid one on the other without mortar, but fitting so truly as to be watertight. The lesser opening was closed by a dam in places which was 40 feet high, and about 100 feet broad on top, and though the first mentioned bund is now a complete wreck, the latter is intact and still continues to turn the river Kaliasote into the Betwa, and from its top the old bed of the stream is recognisable. The shorter but higher bund was broken by Shah Hussain, the greatest of the Mandu Kings, for the purpose of utilising the bed of the lake. Although tradition relates that he never personally benefitted by this act, the fact of the present fertility of the valley, still growing the best wheat in the country, proves his practical statemanship, however, much we may regret the loss of a water storage of such great size and beauty for India."

3.3 Little, however was done towards the construction of large-scale works until the country came under the British Rule. Most notable exception was the Grand Anicut across Cauvery in Madras. The first effort of the engineers in British Rule was directed at improving the existing works rather than constructing new irrigation projects. Three of these improvement schemes which were taken in hand early in the 19th Century are worthy of note. These were (1) the Eastern Chenab Canal in the Punjab; (2) the Eastern Canal in Uttar Pradesh ; and (3) Cauvery Delta System in Madras. In the beginning, the major works were done through two companies which proved a failure. Later on, the Government decided to float public loans for the construction of productive public works. The adoption of this policy was mainly responsible for the great development of canal irrigation in India.

Construction of
Large Scale Works
in India.

3.4 Having made good progress on the construction of large river schemes, the Government paid attention to the construction of protective works. The first big work of this type sanctioned was the Paricha weir on Betwa Canal in Bundelkhand (U.P.) in the year 1881. This formed the opening of another very important era in the history of irrigation in British India. These works were taken primarily for the protection of precarious areas against famines, the direct returns obtainable from them being of secondary consideration. In the small princely states which have now merged in New Madhya Pradesh, such protective works could not be undertaken due to their limited jurisdiction and financial resources.

3.5 In Madhya Pradesh the State irrigation works were constructed according to the recommendations of the Indian irrigation commission which were accepted by the Government of India. Acting on the advice of the Commission, the survey and construction of irrigation works were taken up with the result that a large number of major and minor irrigation works have since been constructed in, the State. The Indian Irrigation Commission approved of the undertaking of protective irrigation works after reviewing the occurrences of famines and scarcities in the past. It laid down a definite policy regarding the selection, financing and maintenance of irrigation works. As a result of the Commission's recommendation. Mr. (Sir) Craddock, Chief Commissioner of C. P. and Berar, prepared a programme for construction of irrigation works costing Rs. 300 lakhs which was approved by the Government of India. The classification of works included in the programme was as below :—

- | | |
|---|----------------|
| (1) River Schemes | Rs. 200 lakhs. |
| (2) Storage Works in Rice Districts. | Rs. 80 Lakhs. |
| (3) Experimental Works in Non-Rice Districts. | Rs. 20 Lakhs. |

Total Rs. 300 Lakhs.

This programme was intended to cover the construction of Mahanadi, Tandula, and Wainganga Canals under (i) the construction of 22 major works and an expenditure of Rs. 7 lakhs in the districts of Bilaspur, Damoh and Sagar under (ii) and the construction of the Ramtek reservoir and two tanks in non-rice districts under (iii).

3.6. The history of development of irrigation in the Mahakoshal region thus started with the implementation of the policy to provide insurance against crop failure in years of drought. The works progressed well during the period 1910-20 inspite of the difficulties created due to First World War. By the introduction of Montague Chelmsford reforms in 1921, irrigation became a provincial subject and central assistance could be only availed in the form of loans.

After 1923, further programme of construction of 9 works to be completed in 14 years was drawn up. Out of these 3 new works for which capital and revenue accounts are kept were under taken. Further construction of works was held in abeyance till the C. P. Irrigation Committee (1927-29) gave its recommendations. This committee recommended that no new work should be undertaken on any appreciable scale till the Government is satisfied with the returns from the works under operation. As the returns continued to be low, further construction programme remained suspended till the year 1944, when the construction restarted for furtherance of the Grow More Food Campaign. The progress on construction during the plan period is dealt with in later chapters.

Irrigation in
Gwalior region.

3.7 The development of irrigation in the former Gwalior state started with the accession to Gaddi of His Highness Maharaja Madhorao Scindhiva. There was a devastating famine in Samvat 1955 (1898 A.D.) and His Highness decided to constitute a special irrigation Department in the year 1905.

3.8. A review of development of irrigation works in the former Gwalior state shows that His Highness was keen to get the minor works constructed in all the districts of the State. This policy was followed by the Irrigation Department of the state till 1914. Later on, construction of Major Irrigation schemes, viz., Sank Asan project, Kaketo Dam, Aoda Dam and Harsi Dam was taken up. An interesting similarity is found in the minds of the then administrators of Madhya Pradesh and old Gwalior State. It is noticed that the starting of irrigation works was done mainly to provide relief against famines in the respective areas. The significant difference in the "Modus Operandi" was that in Madhya Pradesh Major Works alongwith construction of minor works was started as a result of the Irrigation Commission's recommendations, while in the then Gwalior State, most of the works started first were minor tanks spread over the whole state. The total area protected

from the state irrigation works constructed till 1913 was about 2.5 lakhs acres. Under the Major schemes constructed later, an additional area of about 1.70 lakh acres was brought under irrigation. The construction of minor irrigation work was taken up as result of Grow More Food Campaign from the year 1944 onwards.

3.9 In the Holkar State, Irrigation of only cash crops by lift from wells generally was done as revealed from the following figures:—

Source	Irrigated area in acres during 1928.
1. Wells and Baories	33,757
2. Tanks of Flows	1,524
3. Other Sources	1,861
Total	<u>37,142</u>

Out of total 2.05 million of the sown area in the state, the irrigated area was only 37,142 acres.

3.10 Historical research ascribe the construction of most of the magnificent lakes existing in Vindhya Pradesh to the Chandela Rulers, who flourished between 9th to 12th century A.D. Few dynasties have left such splendid monuments of their rule. The real purpose for which these lakes were constructed is obscure. No trace of old sluices of the canals from these tanks exist to suggest that these were meant for doing irrigation, although cultivators may have used the water occasionally for this purpose. It appears probable that these were intended for storing water for use of the populace in the days of turmoil and war and in some cases for scenic beauty and as game preserves. The smaller lakes and tanks though useful as reservoirs for cattles and other nistar purpose also adorned the temples, palaces and fortresses, which are found on the banks of these tanks. The adoption of these tanks for irrigation appears to be a later development. Late Maharaja Pratap Singh Ju Deo of Orchha (1874-30) got constructed and repaired 73 irrigating tanks in order to meet the emergency caused by the famines during the years 1895-96 and 1896-97 and other scarcity years. The detailed records of famines and areas irrigated in the various, princely states which constitute the present Vindhya Pradesh are not readily available, however, it is observed that small irrigation works were started to serve as a means for giving employment to the famine labour. The various types of works constructed were—

- (1) Repairs and deepening of tanks.
- (2) Excavation of canals.

(4) Construction of New Bunds.

(4) Construction of New Bunds.

The gazetteer of Chhattarpur State shows that in the year 1901 the main sources of irrigation was wells installed with Dhenki and Ohris constructed by private efforts. There were also small bunds which served the purposes of storing water for moisture conservation. The area irrigated in Chhattarpur in the year 1907 was about 41,400 acres from all such sources.

History of Irrigation in Bhopal.

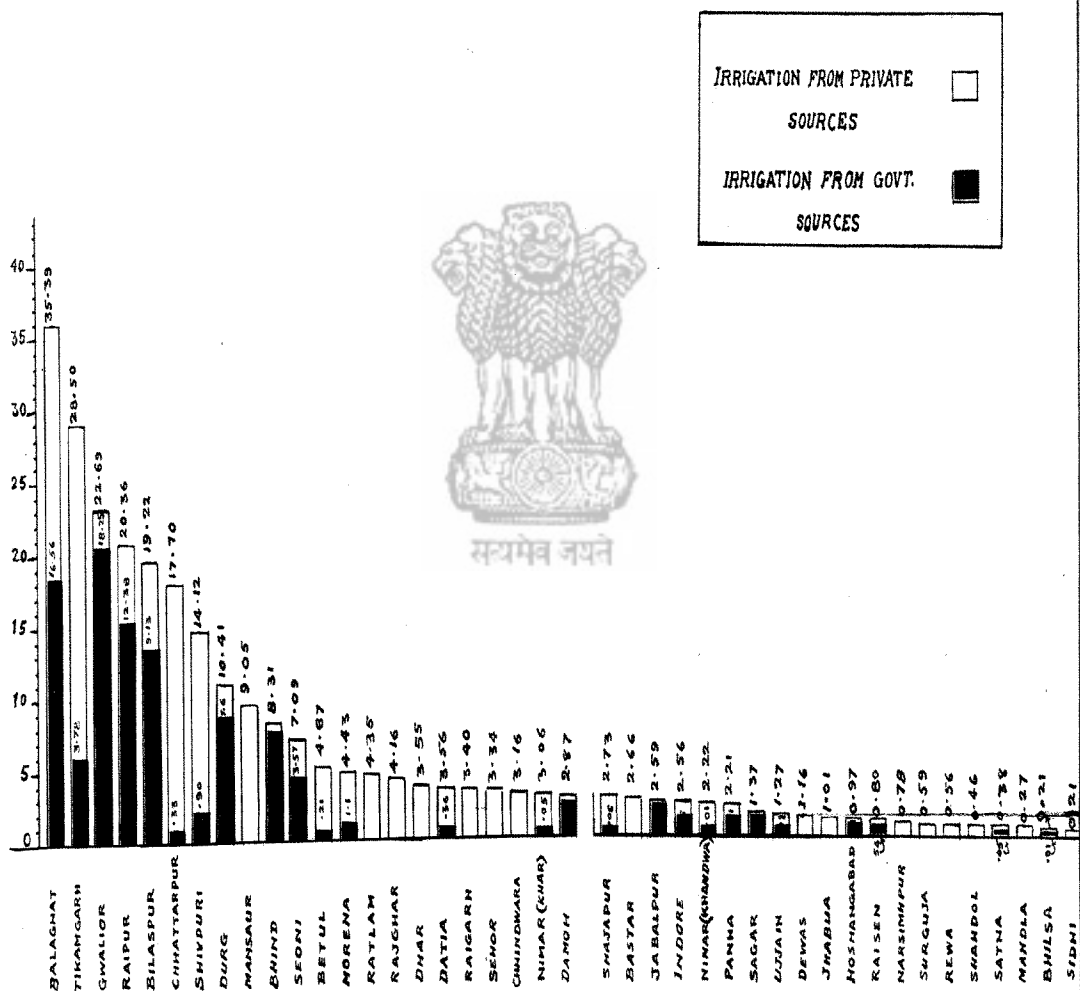
3.11 The area irrigated in Bhopal State was as low as 22,310 acres in 1905-06. The chief sources of irrigation were wells and small tanks. The Palkmati tank was the first big work constructed in the year 1936 for irrigating 4,000 acres on model lines. It was started under the Government Colonisation Department. The policy of the state was to construct more number of small projects for distribution of irrigation benefits in large area. The regular Irrigation Department was created in the state in the year 1954 and a programme was made for the construction of numerous barrages and small tanks in the State.

MADHYA PRADESH

PERCENTAGE OF AREA IRRIGATED TO SOWN AREA

1957-58

DISTRICT-WISE



CHAPTER IV.—DEVELOPMENT OF IRRIGATION IN THE FIRST AND SECOND FIVE-YEAR PLAN PERIODS IN MADHYA PRADESH

4.1 In 1950-51, before commencement of the 1st Five Year Plan, the intensity of irrigation in Madhya Pradesh was second lowest of all states in the Indian Union. In order to step up the area under irrigation, the state decided to launch an extensive irrigation construction programme by systematic construction of works in areas, where till then the irrigation facilities were low or non-existent. The districtwise intensity of Irrigation in 1957-58 was as shown in appendix IV-8, which reveals the wide disparity of irrigation development in various districts of the state.

4.2 Details of Irrigation Projects included in the two Plans, (Period 1951-56 and 1956-61) works taken up for execution, works completed and their financial and physical achievements for the year 1958-59 are given in appendix III-10. Abstracts for the two Plans, drawn from these statements are given below to indicate the achievement on the Plan Projects in different regions of the State :—

Irrigation works taken in First Five Year Plan

A. STATE WORKS

Medium Works

Serial No.	No. of works taken up (Category and No.)	Estimated cost in lakhs	Areas to be irrigated (lakhs acres)	No. of works constructed	Area actually irrigated (Acres)
(1)	(2)	(3)	(4)	(5)	(6)
Mahakoshal	Major 7	553.73	0.60	1	10,500
	Scarcity 9	175.55	0.28	..	..
Madhya Bharat	Do. 6	241.15	0.41	..	..
Vindhya Pradesh	Do. 3	118.57	0.37	..	..
Bhopal	Do. 1	38.00	0.07	..	..
	Total ..	1127.00	1.73	1	10,500

B. INTER-STATE WORKS

Chambal Multipurpose Project	1	9224.00
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Minor Works

Mahakoshal	Minor 28	327.40	0.89
	Village 49	25.44	0.13	46	0.11
Madhya Bharat	Do. 184	184.25	0.70	122	0.25

(1)	(2)	(3)	(4)	(5)	(6)
Vindhya Pradesh	Do. 23	94.00	0.53	..	0.02
Bhopal	Do. 58	49.38	0.21	46	0.10
Total ..	342	685.47	2.46	214	0.48

Irrigation works taken up in Second Five Year Plan

Multipurpose Project (Major)

Tawa Multipurpose Project.	1	2,710	7.88
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Medium Works

Mahakoshal	Major 7	699.3	2.81
Madhya Bharat	Major 12	485.0	0.92
Vindhya Pradesh	Major 12	426.1	1.41
Bhopal	Major 1	551.6	1.64	..	..
Total ..	32	2,162.0	6.78	..	..
Mahakoshal Minor	Works	..	..	..	..
	Village	..	..	..	..

PROJECT WORKS

Madhya Bharat	Do. 21	112.17	0.28	..	..
	Do. 17	..	..	..	..
Vindhya Pradesh	Do. 19	109.67	0.36	..	..
Bhopal	Do. 10	123.62	0.24	..	..
Total ..	67	345.46	0.88	..	..

(N. B.—Figures of acres only are given, leaving hectares for sake of clarity)

4.3 Progress of plan works in the various regions is summarised below :—

(i) In Mahakoshal region, seven medium projects (1) Ari (Seoni), (2) Dudhawa (Raipur), (3) Saroda (Durg), (5) Gangulpara (Balaghat), (6) Sampna (Betul), (7) Dukrikheda (Hoshangabad), were taken up in the First Five Year Plan at an estimated cost of Rs. 553.73 lakhs to irrigate an area 60,000 acres (24,300 hectares). The construction of Ari, Gondli, Gangulpara, Sampna and Dukrikheda Projects has since been completed. In Madhya Bharat region, construction of six medium projects, viz., (1) Mola Dam (Guna), (2) Satak Dam (W. Nimar), (3) Morwan Dam (Mandsaur), (4) Shivgarh Bhedli Tank (Ratlam), (5) Barodia (Rajgarh) and (6) Kunda Nala (Dhar), were taken up during 1st Plan at an estimated cost of Rs. 241.00 lakhs for irrigating an aggregate area of 41,200 acres (16,605 hectares). The head-works in all

cases have been completed but canal works are still in hand, except Kunda Project which is completed. In Vindhya Pradesh region, project reports and estimates of three works viz: (1) Kulgarhi (Satna), (2) Gurma Nala (Rewa), and (3) Narkuni (Sidhi) have been submitted to the Central Water and Power Commission and technical clearance is awaited from the Planning Commission. In Bhopal Region, the modified proposals for Kaliasote Project are being submitted to the Central Water and Power Commission in accordance with their comments.

(ii) During the Second Plan period in Mahakoshal Region following new (Major and Medium) works have been taken up at an estimated cost of Rs. 2,700 lakhs with an irrigable capacity of 8,20,800 acres (3,32,100 hectares). These works are (1) Tawa Project (Hoshangabad), (2) Bila Project (Sagar), (3) Development of Maniari Canal System (Bilaspur), (4) Kedar Nala (Raigarh), (5) Keswa Nala (Raipur), (6) Remodelling of Mahanadi Canal System (Raipur) and (7) Nahlesara Project (Balaghat). The works are under various stages of construction. In the Madhya Bharat region following twelve projects at an estimated cost of Rs. 485.00 lakhs to irrigate an area of 92,000 acres (37,260 hectares) have been included in the Second Five Year Plan. (1) Development of Harsi Canal (Gwalior), (2) Jasaiyya (Guna), (3) Bamori (Guna), (4) Akhajhiri (Shivpuri), (5) Chillar (Shajapur), (6) Pampawati (Jhabua), (7) Bhainsakheri (Ujjain), (8) Pingal Nala (Ratlam), (9) Chandrakesar (Dewas), (10) Choral (Indore), (11) Ketan (Vidisha) and (12) Chhapi (Rajgarh). Out of these Chandrakeshar and Chillar Projects have been technically cleared by the Planning Commission. Work on Chandrakeshar Project only has been started. Other Projects are under various stages of investigation and survey.

4.4 In the Vindhya Pradesh region the following twelve works at an estimated cost of Rs. 426.42 lakhs to irrigate an area of 1,41,000 acres (57,105 ha) have been included in the Second Five Year Plan viz : (1) Nagda Nala in Tikamgarh, (2) Nandanwara in Tikamgarh District, (3) Parari (Panna), (4) Devendranagar (Panna), (5) Upper Ken Valley (Panna), (6) Unchera (Satna), (7) West Sohawal (Satna), (8) Raigawan (Satna), (9) Nagod Canal (Satna), (10) Calhatta (Shahdol), (11) Chathat (Shahdol) and (12) Beniganj (Chhattarpur District). Out of these Beniganj Project and Nandanwara have been technically cleared by Planning Commission. Work on both of the schemes is in progress. Other schemes are under various stages of investigation and survey. For project viz : Unchera, West Sahwal, Nagod Canal and Chathat have been declared unfeasible. In Bhopal region, one scheme, viz., Barna Project has been surveyed and investigated by Central Water and Power Commission and has been technically cleared by the Planning Commission. Work on this has also started.

I—Chambal Multipurpose Project.

4.5 The state can boast of the achievement of construction of Multipurpose Chambal Project which has stored water for the first time this year. Salient features of the Project are described below :—

Chambal is the largest of the north-flowing rivers of the state of Madhya Pradesh. It carries a large volume of water during the monsoon months which dwindles down to a trickle in the dry months. Power development or perennial irrigation was, therefore, not possible without storage. To ensure plenty of water for irrigation and power, which would bring considerable wealth to the people through agricultural production and setting up of industries, the Chambal Valley Development Scheme was finalised in the year 1949. The first stage of the project was included in the First Five-Year Plan in December, 1952. The scheme is a joint venture of Madhya Pradesh and Rajasthan States and is estimated to cost Rs. 92.24 crores as per revised estimate and will, on full development yield additional 4,75,000 tons (4,82,600 metric tonnes) of food grains annually by irrigating 14 lakhs acres (5.67 lakh ha) in Madhya Pradesh and Rajasthan States and generate 2,10,000 kw of power. The scheme comprises of construction of three dams with power houses and transmission systems and a barrage along with necessary canals taking off from the barrage.

4.6 The first dam in the series, viz: Gandhi Sagar Dam, is located five miles down-stream of the Chaurasigarh Fort and forty miles south of Kotah. It is estimated to cost Rs. 13.6 crores and to store 6.85 million acres ft. (0.846 million ham) of water with water spread area of nearly 266 sq. miles (689 sq. km). It is one of the cheapest dams in the World in relation to its storage capacity. The dam is being constructed by the Government of Madhya Pradesh. The second in series is Rana Pratap Sagar Dam. It will be constructed about 20 miles (32.2 km) further down near Rawat Bhatta village in Rajasthan. Rana Pratap Sagar Dam, will have a water spread area of 60.0 sq. miles (156 sq. km) will hold 2.33 million acre ft. (0.21 million ham) of water and will cost Rs. 7.02 crores. The third in the series is the kotah Dam, about 10 miles, (16.1 km) up stream of Kotah City. It will have a storage capacity of 0.14 million acre feet (0.0176 million ham) of water. Kotah barrage, the last in the series, will, be constructed at a site, half mile up stream of Kotah for regulating supplies to two off-taking canals, one on the left bank and the other on the right. The water from the canals will irrigate land totalling 14 lakh acres (5.67 lakh ha) in 19 tahsils of Rajasthan and 12 tahsils of Madhya Pradesh.

4.7 **Power Potential.**—Gandhi Sagar Power Station will have an installed capacity of 92,000 K. Watt of electric power and will generate 80,000 k. watt of power at 60

per cent load factor. The Bhupal Power Station at Rana Pratap Sagar Dam will generate 30,000 K. Watt of power and Kotah Power Station 45,000 K. Watt each at 60 per cent load factor..

Stages of Development.—The development of this Project has been phased to take place in three stages. The first stage consists of:—

Unit					Cost in crores of Rs.	Year of completion
(1)					(2)	(3)
1.	Gandhi Sagar Dam	..	..	..	13.60	1960-61
2.	Gandhi Sagar Power Station	..	..	..	4.79	1960-61
3.	Kotah Barrage	..	..	..	3.83	1959-60
4.	Transmission System	..	..	..	10.98	1960
5.	Canal System	..	..	..	30.40	1962-51
Total					63.60	

4.8 In the second stage, Rana Pratap Sagar Dam, Power Station and its transmission system will be constructed at a cost of Rs. 18.65 crores. In the third stage, Kotah Dam and Power Station with its transmission system will be constructed at an estimated cost of Rs. 10.00 crores.

4.9 Three generators of 23,000 K. Watt capacity each have been installed and power generation started. The first 40 miles length of right bank canal including distributaries and cross drainage works will be completed by 1960-61 and Irrigation Supplies for about 45,000 acres (18,220 ha) would be made available. The work of right bank canal in Madhya Pradesh is scheduled to be completed by 1963-64.

4.10 In the Second Five Year Plan of the State, an amount of Rs. 21.39 crores is provided, of which Rs. 13.05 crores is for irrigation sector and Rs. 8.34 crores for power sector of the Chambal Multipurpose Project. The main items of expenditure are as follows:—

Construction of—

(a) Gandhi Sagar	..	Rs. 276.75 lakhs.
(b) Right Bank Canal	..	Rs. 898.29 lakhs.
(c) Rana Pratap Sagar Dam	..	Rs. 129.96 lakhs

Total .. Rs. 1305.00 lakhs.

4.11 Out of Rs. 8.34 crores, which are earmarked for the power sector of the Chambal Multipurpose Project from which 30,000 K. Watt of electrical energy is expected

to be generated, the main items of expenditure are as follows:—

(a) Gandhi Sagar Power Station.	..	Rs. 187.85 lakhs.
(b) Transmission System	..	Rs. 547.15 lakhs.
(c) Rana Pratap Sagar Dam	..	Rs. 99.29 lakhs.

Total :..Rs. 834.30 lakhs.

4.12 The Chambal Scheme has been thoroughly investigated and has been found to be technically sound and financially remunerative by the Planning Commission. Irrigation of 14 lakhs acres (5.67 lakh ha) of land will, besides yielding additional 4,75,000 tons (4,82,600 metric tonnes) of food grains annually, considerably change the complexion of agriculture in the area. The Madhya Pradesh area to benefit by irrigation has been subject to frequent famine conditions and it is estimated that, during the last 25 years, the State Government had to spend, on an average, about Rs. 2 lakhs annually for scarcity works and grant in revenue remissions. The commanded area in Rajasthan has not met with severe famines in recent years, yet the benefit to the area in terms of insurance against scarcity conditions may be estimated to be of the order of Rs. 50,000 per year. In terms of savings, this aggregate amount of Rs. 2,50,000 is quite significant.

II.—Tawa Multi-purpose Project (Hoshangabad District).

4.13 This Project envisages construction of a dam across Tawa River, half a mile down-stream of its confluence with the Denwa River and 3½ miles (5.64 km) up-stream of the Central Railway bridge between Itarsi and Jabalpur near Bagra Railway Station. The dam will consist of a masonry overflow weir of 1000 feet (305 m) length with earthen embankments on either flank. The maximum height of the overflow dam above the lowest foundation will be 98 ft (29.89 m). The project will irrigate 7.875 lakhs acres (3.189 lakh ha) of Kharif, rabi and perennial crops when completed in Hoshangabad, Narsimhapur and East Nimar Districts. The total length of main canals will be 90 miles (145 Km) and that of distributaries and minors 620 miles (998 Km). With the completion of the project, additional annual yield of food-grains of 2.07 lakh tons (2,289 lakh metric tonnes) is expected. The total estimated cost of the project is Rs. 27.10 crores and it will generate 20,000 K. Watt of power at 60 per cent load factor, besides irrigation as detailed above. The power will be supplied to the districts of Hoshangabad, Narsimhapur, Jabalpur and Bhopal.

4.14 Till the end of March, 1960 a sum of Rs. 33.62 lakhs was spent on preliminary work, surveys and investigations of the scheme. For the year 1960-61, a sum of Rs. 10.00 lakhs (since reduced to Rs. 9.5 lakhs) has been

provided for continuing survey and investigation, preparing designs and estimates and construction of approach roads and buildings for the working staff of the project. An amount of Rs. 90 lakhs has been provided for 1961-62.

III.—Remodelling of Mahanadi Canal System.

4.15 This project consists of two parts—

- (a) Construction of Dudhawa Reservoir estimated to cost Rs. 2.39 crores; and
- (b) Remodelling of Mahanadi Canal System estimated to cost Rs. 3.217 crores.

(a) Dudhawa Reservoir is the biggest schemes undertaken in the First Five Year Plan in Madhya Pradesh. The Reservoir is under construction by damming the Mahanadi River, about 13 miles (21 Km) West of Sihawa and 18 miles (29 Km) East of Kanker. The tank will provide additional supply through Mahanadi Canal in order to cater for irrigation of additional 1.4 lakhs acres (0.567 lakh ha) of paddy under the existing Mahanadi Canal System, which will be extended for the purpose. The additional annual yield of food-grains will be 28,000 tons (28,450 metric tons). The reservoir will store 10,919 M. cft (283.5 M. cm) of water. No separate canal system under the reservoir is proposed and the storage would be passed down the river to be picked up lower down at Rudri weir.

(b) The existing Mahanadi Canal System was completed during the year 1927 and the area fixed for irrigation under the system, after many changes made by the Government from time to time, was 2,10,000 acres (85,050 ha) of paddy crop. The intensity of irrigation in the commanded area is as low as 31.6 per cent. Clearly, therefore, there is scope for extension of irrigation in the commanded area. It is now proposed to extend irrigation facilities to additional 1.4 lakh acres (0.567 lakh ha) covering 268 villages, out of which 41 villages were once under agreement but subsequently were dropped out due to lack of supplies.

4.16 The culturable commanded area under the system is 8.1 lakh acres and attempts have been made to distribute the benefits of the remodelling scheme equitably in the three Tahsils of Raipur District viz: Dhamtari, Raipur and Baloda Bazar. In order to secure the efficiency in the distribution system, the following works are included in the scheme :—

- (1) Remodelling of the Mahanadi Main Canal and Branch Canals.
- (2) Construction of 75 miles (1203 Km) of distributaries and minors.
- (3) Reconstruction of abandoned distributaries 342 miles (55 Km).

- (4) Remodelling of the distributaries which will carry appreciably increased discharge for new villages coming under irrigation.
- (5) Improvement of water ways and service paths on all channels.
- (6) Installation of outlets on permanent basis; and
- (7) Construction of water courses so as to attain working duty of 125 acres to a cusec, (1807 ha per cum) against the present duty of 100 acres per cusec, (1446 ha per cum) at the outlet.

The estimated cost of remodelling the canal system is Rs. 321.7 lakhs, which works out to Rs. 230.00 per acre (Rs. 568 per ha). The project has already started giving benefits since the year 1959-60, when an additional area of 19,431 acres (7864 ha) was irrigated. It is expected that by the end of the year 1960-61 extra irrigation in about 10 000 acres (4050 ha) of paddy will be effected. On completion of Dudhawa Project and Mahanadi Canal. On coming a total area of 3,50,000 acres (1,41,700 ha) will come under irrigation as against 2,10,000 acres (85,050 ha) under irrigation upto the year 1958.

IV—Gandli Feeder Reservoir

4.17 Irrigation of kharif crops in Durg district is principally done through Tandula Canal System, which has an irrigable area of 2,50,000 acres (1,01,300 ha). The designed area under the canal system is only 1,65,000 acres (66,820 ha) although the canal at present, is irrigating area slightly in excess of the designed figure.

4.18 Looking to the ever increasing demand of water for irrigation, the State Government in 1953 sanctioned the scheme of construction of Gondli Feeder Reservoir across Jujhara and Genji nalas near Gondli village with a capacity of 3019 M. cft of water, to feed the Tandula Reservoir, by means of a feeder channel, 6 miles (9.66 km) long, and to provide irrigation to an additional area of 52,000 acres (21,060 ha). The object of additional irrigation could not be fully realised as due to the construction of Bhilai Steel Plant in the district bulk of water of Gondli Reservoir had to be earmarked for the Steel Plant, leaving enough to irrigate an area of 7,400 acres (2,997 ha). Work on this feeder reservoir was started in June, 1954 and completed in June, 1956. Total outlay on the work is Rs. 89.00 lakhs. About 1800 M. cft. (51 M cm) water was supplied from the Reservoir in 1960 to the Bhilai Steel Plant.

4.19 **Minor Irrigation works.**—All works costing less than Rs. 10.00 lakhs each or irrigating less than 4,000 acres (1,620 ha) are being classed as minor irrigation works. These works have further been sub-divided into (i) very small works costing from a few thousand rupees to 2 lakhs (ii) works of bigger nature but costing less than Rs. 10 lakhs and (iii) private irrigation works like wells (new and repaired). Works falling in

category (iii) are being handled by the Agriculture Department, while works under the category (ii) are being wholly done through the agency of the Irrigation Department. Works under category (i) have been taken up in the past by different agencies viz., the irrigation Department, Agriculture Department and Revenue Department in the Community Development Blocks. Of late, the Irrigation Department has actively taken up the departmental execution of minor irrigation works.

4.20 Under Irrigation Department programme of Minor Irrigation in the First Plan, 342 schemes, costing Rs. 6.85 crores and capable of irrigating an area of 2.46 lakh acres (0.992 lakh ha) were taken up. This included construction of new tanks, pick-up-weirs, restoration and improvement of old works and a few lift irrigation schemes. By the end of First Plan, 214 minor irrigation schemes were completed and the remaining 128 schemes were carried over to the Second Plan. A potential of 28,300 acres (11,460 ha) was created in the year 1955-56 from the First Plan schemes and an area of 25,378 acres (10,283 ha) was actually irrigated.

4.21 In Madhya Bharat region, some funds were made available to each district under the Food Production Drive for execution of minor irrigation works. In Mahakoshal region also funds were similarly made available to the Collectors. The exact achievements under these categories are not known. Works under these sectors, other than those of private and individual nature, mainly consisted of construction of small anicuts, regulators bundhs and restoration of old tanks on a grant-in-aid basis.

4.22 In the Second Plan, 67 new minor irrigation schemes besides the 128 continuing from the First Plan were included in the minor irrigation programme of Irrigation Department. Of these, 32 schemes were dropped after detailed investigation. Of the remaining 163 projects, 98 works are expected to be completed by the end of second plan and 65 will be carried over to Third Plan for completion. The minor irrigation programme of the second plan also included tube-wells in the Narmada Valley, 8 tube-wells with their channel system were completed by June, 1960. Works on 48 additional tube-wells has been taken up in 1960-61 and is expected to be completed by June, 1961. The anticipated expenditure on minor irrigation including tube-wells during the second plan is Rs. 6.5 crores. Irrigation potential to the extent of 1,24,700 acres (48,885 ha) including 5,000 acres (2,025 ha) from the tube-wells (schemes) is expected to be created by the end of Second Plan under schemes executed by Irrigation Department. Against this, actual irrigation will have been achieved in 65,000 acres (26,320 ha). An outlay of Rs. 2.25 crores will be required in the Third Plan to complete 65 spill-over minor schemes and the remaining work on tube-wells.

4.23 For execution of works in the C. D. Blocks Irrigation Department has made a significant contribution

in the recent past. Till the end of 1958-59, Rs. 25 lakhs had been spent on execution of minor irrigation schemes. During the year 1959-60, approximately Rs. 45 lakhs was spent. 306 works costing Rs. 94 lakhs for benefitting an area of 49,500 acres (20,043 ha) were under execution till March 1960, in the various Community Development Blocks in the State. Of these, 70 works irrigating an area of 11,000 acres (4455 ha) have already been completed.

4.24 As in the First Plan, minor irrigation works were also executed during each year of the Second Plan under the Collector's sector for which lump-sum of Rs. 50,000 was made available per year in each district. Under Agriculture sector, loans continued to be advanced to individual borrowers for sinking wells, repairs to old wells and installation of pumping sets. Approximately Rs. 50 to 100 lakhs per year was spent on this category of work under the Community Development Programme. It has not been possible for this Committee to ascertain the exact physical achievements under this head. In the final analysis it is expected that an irrigation potential of about 2,00,000 acres (81,000 ha) have been created from schemes under Agriculture sector including the Community Development programme.



CHAPTER V.—REVIEW OF IRRIGATION POLICIES PAST AND PRESENT

5.1 The State of Madhya Pradesh as constituted at present has forty-three districts out of which fourteen districts were under British Administration till the country attained independence in 1947. The remaining twenty-nine districts were parts of the princely State as described in para. 2.2.

Irrigation policies in the past were diverse prior to independence as there were sixty-seven different Rulers who ruled the various units of the State. The Indian Irrigation Commission (1902) laid down a precise policy for the Provinces in British India, including the Central Provinces and Berar and advised the Rulers of States to adopt suitable policies for irrigation works to meet their needs and finances.

5.2 The desirability of construction of State Irrigation works in the Central Provinces was considered as early as the year 1886, shortly after the constitution of Central Provinces and Berar as a separate province in 1862. At that time the Government only considered the investigation and construction of productive works. Irrigation schemes on Wainganga, Kanhan and Pench rivers were considered but did not materialise due to prohibitive cost and were shelved.

5.3 The Indian Irrigation Commission was appointed in 1901 to report on Irrigation in India as a protection against famine. It came to the conclusion that construction of small scale Irrigation works in the rice growing districts of Central Provinces and Berar, although never likely to be directly remunerative, was urgently required for protection against drought, as compared to the productive works in other provinces. A brief history of important famines and scarcities in C. P. and Berar and in other parts of the State is given in Appendix III-22.

5.4 They also recommended the grant of Taccavi advances for agricultural improvement on more liberal terms and to issue grants-in-aid in tracts in which cultivators had become impoverished due to famine. The Commission also impressed on a policy of permanent or long term exemption from enhancement of assessment on account of agriculture improvements along with extensive employment of relief labour on agricultural works.

5.5 In pursuance of the above recommendations the investigation and construction of 16 works was taken in hand by 1906. In the same year the old Madhya Pradesh Government made definite proposals for carrying out certain new schemes which the Government of India, after a good deal of correspondence, accepted in the year 1909, and the works were started by the year 1910. The proposals were to spend Rs. 200.00 lakhs on river schemes, Enforcement of the policy in old Madhya Pradesh.

Rs. 80.0 lakhs on storage works in five districts and Rs. 20.0 lakhs on experimental works in the non-rice districts making a total of Rs. 300.00 lakhs. The works included in the proposal were: Construction of Mahanadi, Tandula and Wainganga canals under river schemes and 22 Major in rice growing districts. Rs. 7.00 lakhs were allotted for the districts of Bilaspur, Damoh and Sagar together with the construction of Ramtek Reservoir and 2 tanks as experimental works.

5.6 The above programme of construction was carried out till 1930-31. During this period, the irrigation potential (in the jurisdiction of the present State) was raised from 0.66 lakhs acres (0.627 lakhs ha) to 6.51 lakhs acres (2.64 ha) which give an average of 20,000 acres (11, 740 ha) per year. The programme of construction in old Madhya Pradesh later on was brought to a standstill under following recommendations made by the Central Provinces Irrigation Committee.

(a) In some areas development has been disappointing and the financial return is unsatisfactory. No new works should be undertaken on any appreciable scale until Government is satisfied with the development of and the returns received from the works that have already been constructed, and it is proved beyond doubt that the cultivators appreciate the advantages of irrigation and are prepared to pay reasonably for them.

(b) If it is decided eventually to construct new state works this should be done mainly in Chhattisgarh and to some extent in Bhandara and Balaghat. No new works should be undertaken in the North of the province except perhaps in Seoni and in the Shahgarh tract of the Saugar district or in Chanda, until the areas commanded by existing works are fully developed.

(c) If it is decided to undertake a new programme of construction of State works, it would be permissible to construct a work the cost of which is Rs. 100 per acre (Rs. 247 per ha) or slightly more if after full examination by the officers of the Revenue and Agricultural Departments and scrutiny by the Finance Department, it is accepted by Government as suitable for inclusion in the programme of works.

Grow More Food Programme.

5.7 In pursuance of the recommendations of the Central Provinces Irrigation Committee, construction of Irrigation works remained suspended until the year 1944 when under the Grow-More-Food Campaign, a beginning was made and a few small irrigation works were started.

The Grow-More-Food Campaign launched by the Government of India for additional food production included the construction of medium and minor Irrigation Schemes by the Irrigation Department and petty schemes by the Agricultural Department. The construction of Murrum Nala and Chichbund tanks in Balaghat and Ari

Tank in Chhindawara (now Seoni) District were sanctioned as medium Schemes. The details of these projects are as below :—

	Cost Rs. (Lakhs)	Area Acre Hectares	Year of commen- cement	Year of com- pletion
(1)	(2)	(3)	(4)	(5)
Murram Nala	10.98	5,200	1-11-43	31-3-50
		2,106		
Chichbund	9.78	5,000	4-4-46	31-2-51
		2,025		
Ari	33.70	10,500	18-11-46	1952
		4,253		

Under the latter class the following schemes were taken up:—

(a) **Sinking of new wells.**—During the period 1943-47, loans were granted repayable in 5 years at Rs. 500 per well with 20 per cent subsidy at a rate of interest of Rs. 4.11 per cent per annum. The terms and conditions for issue of the loan to a cultivator were to guarantee 3 acres (1.21 ha) of wheat cultivation or one acre of vegetable produce per well. Later on, the loan amount was raised to Rs. 1000.

(b) **Repair to old wells.**—For repairs to old wells, the maximum limit of loan was Rs. 200 per well with subsidy of 20 per cent. The loan was raised in 1947-48 to Rs. 400. The subsidy was, however, kept the same.

(c) **Rahats.**—Due to paucity of steel made goods in the markets the cultivators could not install the rahats although wells were there. Taccavi loans were issued at Rs. 1,000 per rahat which carried a subsidy of 25 per cent.

(d) **Construction and repairs of small village tanks.**—

(i) **Under private sector.**—During the period 1944-45 to 1947-48, loans were given at Rs. 100 per acre (Rs. 247 per ha) of irrigable capacity of a tank. 20 per cent of subsidy was given to cultivators. The response was very poor and the loan amount was then raised by Rs. 25 to 50 per acre (Rs. 62 to 123.5 per ha) of irrigable capacity. The subsidy was also increased from 20 to 50 per cent. The conditions of the loan advanced were liberal and are reproduced below :—

- (i) Loans are granted to cultivators to a maximum limit of Rs. 10,000 per tank in case of new tank and Rs. 5,000 per tank for repairs of an old tank provided the Deputy Commissioner was satisfied about the capacity of the borrower to undertake the project.

- (ii) The loan is repayable within five years and bears interest at Rs. 4.69 per cent per annum from the first year. The rate up to 1951-52 was 3½ per cent per annum and no interest was charged.
- (iii) Half of the amount is treated as subsidy and is remitted in the first year if the loan is properly utilised according to the prescribed conditions, that portion of the loan, which is to be treated as subsidy, remains interest-free from the very beginning.
- (iv) Loans are granted to cultivators on the basis of the "Means test."
- (v) Cultivators are eligible for the concession of subsidy only if the water from the tank is utilised for irrigating food-crops, specially paddy at least for five years after the completion of the work.

(ii) *Under public sector.*—Looking to the poor response of construction of village tanks by the cultivators, the Government changed the policy and entrusted the execution of tanks irrigation more than 50 acres (20.25 ha) to the State irrigation Department. Later, when the separate village project Divisions were sanctioned, tanks irrigating up to 600 acres (243 ha) each were also included in the scheme.

Policy in Madhya
Bharat.

5.8 Prior to appointment of Indian Irrigation Commission, the irrigation works in the Gwalior State were few in number and were mostly petty works. Acting on the advice of the Irrigation Commission. His Highness, Madhao Rao Scindia appointed Mr. Tayler in 1905 to organise a regular Irrigation Department of the State. Later, on the advice of Mr. Sydney Preston, C. I. E., (the able retired Inspector-General, Irrigation, Government of India) the Maharaja got a large number of Irrigation works constructed in the State. It is note-worthy that the encouragement by the Darbar for construction of small tanks and wells for irrigation had been the policy in the State from time immemorial. Due to the constant warfare and ravages of the pindaris, the ancient irrigation works were neglected and this increased the aridity and erosion of valuable surface soil in the various parts of the State. In 1896-97; a Severe famine occurred in the State, when 352 small works, costing Rs. 3 lakhs were investigated and completed. This construction policy starting since the famine year, was continued till 1900 when another scarcity occurred. The increased employment was given on a number of minor works which by this had gone up to 894 in number. The Darbar remained fully conscious of keeping ready a programme of irrigation works to be executed in famine, years. After the famine of 1900, additional 840 small irrigation works were taken up. Later, investigations of major schemes, viz. Tigra, Pagara, Sank-Asan were vigorously persued.

It was also observed by the State Engineers that there were certain tracts in the State where irrigation by wells could economically be used for which advances were given by the State. Interest was charged at 4 per cent during the first year of construction and 6 per cent for the subsequent years and the land irrigated was assessed at dry rates up to the next settlement.

5.9 Being not content, with the actual construction of Irrigation works, the Maharaj under the advice of Sir Sydney Preston evolved the following long-term policy of construction of Irrigation works in the State:—

The whole State was divided into three regions classed 'A', 'B' and 'C' according to the need of irrigation in each class. The areas under Class 'A' comprised portions secure against famine; Class 'B' was such area, where the means of irrigation were fair and an active programme of construction was not urgent; the remaining State was class 'C' area and comprised of all those out-laying parts (like Sheo-pur and Esagarh) where means of irrigation and water supply was scarce. The construction of works in Class 'C' area was considered more urgent than schemes in the tracts A and B. This policy was steadily followed with the result, that the conditions of the agricultural classes improved in the State.

5.10 Unlike Gwalior State, the construction of irrigation works in the adjoining Holkar State was not taken up. His Highness Maharaja Tukoji Rao II, had initiated a policy which was vigorously pursued, and a number of tanks, wells and other sources of water supply were completed. Concessions were promised and given in the shape of 'Inam Lands' which were granted for maintaining 'Bandhs' etc. Subsequently, this policy received a set back and irrigation lost most of its attraction, as in former days poppy was the chief irrigated crop which to many tenants was a source of substantial income. In fact irrigation was practised, if for anything for this crop and such success was attained in its culture that Malwa for long was noted for opium product. Later, when there was contraction of poppy cultivation, it was as a matter of course bound to react on irrigation, which it did. Prior to 1929, an area of 23,835 acres (9653 ha) was returned under poppy cultivation. On a rough calculation the value of opium produced, in that area was about Rs. 18.1 lakhs, and the amount of land revenue for the State fixed at the settlement prior to 1920, was about Rs. 37 lakhs, that is to say the income from poppy alone was enough to pay about 50 per cent of the land revenue.

5.11 Vindhya Pradesh is carved out of Baghelkhand and Bundelkhand, the principal State in Baghelkhand being Rewa. The southern part of Baghelkhand had no important irrigation work, while the northern part, it is recorded in the Irrigation Commission (1901) report that 13,700 acres (5549 ha) were irrigated during the year 1809-1810 of which

4,000 acres (1620 ha) were irrigated from wells and 7,600 acres from other sources, *viz.*, small river diversion channels. It is observed that construction of irrigation works in the past was done by Baghel and Bundel Rajput Rulers at some places and there remained considerable scope for construction of even small irrigation works at other places. In Bundelkhand, the physical and geological formations are favourable for irrigation; this area is also liable to famines. In 1896-97 this area suffered due to famine to the same extent as the adjoining portion of the British territory. At that time advantage was taken to examine the possibility of relief works which would serve as protection works. A British Engineer Officer, Captain Ewbank was employed on this duty and he drew up a number of projects for small works in Orchha and other States, such as tanks and field embankments, which were estimated to cost, about Rs. 4 lakhs, for protection of crop in 18,000 acres (7290 ha). Works were done mainly on Bandhs and wells. The Maharaja of Orchha State took keen interest for extension of irrigation during the famine of 1901 and started the test works in Tikamgarh, Baldeogarh, Jatara, Orchha and Tahruli Parganas. The old works constructed by the Baghel and Bundela Rajput Rulers were repaired and maintained after they were handed over to the newly formed Irrigation Department of Vindhya Pradesh in the year 1953.

Policy in Bhopal State.

5.12 Prior to the year 1936, there was no State irrigation tank in the erstwhile Bhopal State. Whatever irrigation was practised was done from wells and that too on a very limited scale. The first State irrigation work constructed was Palakmati tank which was designed to irrigate 4000 acres (1620 ha) and was completed in the year 1939. The policy formulated by the then Bhopal State was to construct small Irrigation Projects, as they earned quick returns on the investments. Tanks completed later were Jamunia and Ajnal. The run off from big rivers of the State, *viz.*, Betwa, Kalisote Halali, Barna and Kolar remained unexploited, due to limited resources of the State.

5.13 The irrigation policy in other units of administration was directed to encourage private irrigation by construction of wells and bandhs and tars. This is but natural as many of the small States had limited jurisdiction and resources. Owing to these limitations, storage works of an appreciable size could not be executed.

Present policy of the Planning Commission.

5.14 The introduction of first plan in 1951 made a major shift in the Policy of the Government of India, which was soon followed by the State also, in so far as sanctioning of irrigation works was concerned. The Planning Commission recognising the general desirability of making the best possible use of the land and water resources with a view to reducing the country's dependence on imported food and agricultural raw materials accorded high priority

to irrigation works in the First Plan, which was continued in the 2nd plan and has to be pursued in the 3rd Plan as well.

5.15 As the State's Plans have to fit in the large frame-work of the country's plan, the policy of the States in the matter of irrigation development has also to be correlated with the policy adopted by the Planning Commission; under the constitution of India the Central Government has assumed the responsibility of regulation and development of inter-State river valley projects. Large projects call for heavy financial outlays and these can not be taken up by the single-state individually unless a large measure of central assistance is made available. For assessing the benefits creditable to each State and for adequately tackling the various aspects of inter-State projects, the River Board Act, 1956 provides for constitution of River Boards. River Board Act of 1956.

5.16 The financial assistance for the construction of medium projects is given by the Central Government from 'Miscellaneous Development Fund', under the Special Programme for improving conditions in the scarcity area. Central assistance to States are given on special terms in the form of a loan which is Interest-free for the first five years and repayable by 20 equal instalments commencing from the sixth year. For construction of the wells in proven areas the Central Government advances long-term loans to cover the entire expenditures incurred, subject to scrutiny of project estimates. In the case of exploratory tube-wells in unproven areas, the question whether a subsidy on the same principle, as in the case of minor irrigation schemes, should be sanctioned, in addition to a loan, is considered on the merits of each case. The financing of minor irrigation schemes is done more liberally and the following principles of assistance of finance is adopted by the Centre:— Financial assistance from the Central Government.

- (i) A scheme yielding a return of $4\frac{1}{2}$ per cent per annum and which would reimburse over a period of 20 years 90 per cent of this cost is considered as economic, deserving no subsidy from the Centre.
- (ii) Long-term loans will be admissible to cover the remunerative portion of scheme.
- (iii) Generally, surveys of minor irrigation will be eligible for Central subsidy up to 50 per cent of the total cost on merits of each case.
- (iv) In the case of private works, the subsidy will be at the overall rate of 25 per cent but in exceptional cases where the schemes are for the benefit of backward or under developed areas and where the schemes are good but their cost is exceptionally high, the subsidy may be increased up to 50 per cent of the total cost.

- (v) Construction of small channels in the hilly areas will be eligible for an overall subsidy not exceeding 50 per cent of the total cost.
- (vi) If a scheme yields less than $4\frac{1}{2}$ per cent the subsidy will be worked out on the difference between the return at the rate of $4\frac{1}{2}$ per cent and the actual return over a period of 20 years.

Conclusion and
Recommendations.

5.17 Since the State of Madhya Pradesh is the most under developed State both in the matter of Irrigation and existing resources, we strongly recommend that the Planning Commission should relax the prescribed percentage returns from the irrigation projects constructed in this State. Against the All-India average of 20 per cent the intensity of irrigation in this State is only 6 per cent which is the lowest in the country. In order that the State may take its place at par with other States in respect of irrigation, it is recommended that as much financial assistance as possible should be given by the Central Government. Special funds should be allocated for this State besides the annual Plan ceilings to make up the lag in Irrigation intensity. In order to expedite the sanction of the projects for the development of the State, the limit of Rs. 10 lakhs should be raised to Rs. 50 lakhs for approval of the projects by the Planning Commission.

In view of low financial results with percentage return of only 3 per cent at the most obtained from the large Irrigation works which have been in operation during the last 40 years, we recommend that Irrigation works of slightly un-productive nature should be permitted to be taken up in the interest of welfare of the State. The yardstick of financial productivity was adopted in the country under the alien rule. After the achievement of independence the whole out-look should change and Irrigation works should not be considered on commercial lines, but as definite means of effectively increasing the food production so essentially needed to feed the teeming millions of the country's population. Furthermore the topography of this large State is far too uneven as compared to that of plains of the U.P. and Punjab. Irrigation works here are bound to cost much more per acre here than in those States. Also after the exploitation of the cheaper sites the difficult ones would necessarily be costlier.

CHAPTER VI.—DIFFERENT TYPES OF IRRIGATION WORKS IN MADHYA PRADESH

6.1 The peculiar and undulating topography of the State lends itself to different types of irrigation works. The large and small tanks of Chhattisgarh, Gwalior, and Bundelkhand, the pick-up weirs (Bandharas) of Nimar, the tube-wells in the Narmada valley, and wells dotting practically the whole State are the typical irrigation works. The following table gives the irrigated areas in the State from different sources:—

Table

S. No.	Details of areas	Area in acres	Lakhs Hectares	Percentage of gross area
(1)	(2)	(3)	(4)	(5)
1	Gross area of the State as per village papers	1083	438	100
2	Net area sown	410	166	37.8
3	Area Irrigated—			Percentage of net area sown
	(i) From old Govt. Tanks existing before first plan.	9.74	3.94	2.38
	(ii) From new Govt. Tanks constructed in plan period.	0.59	0.24	0.14
	(iii) From private tanks	6.01	2.44	1.47
	(iv) From Wells	7.40	2.99	1.80
	(v) From other sources	1.05	0.42	0.24
	Total area irrigated	24.79	10.03	6.03

6.2 By far the most important source of irrigation is the storage tank, which impounds surface run-off. It is the earliest system of irrigation in use in Madhya-Pradesh. The following extract of evidence given by Mr. F. G. Sly, Commissioner of Settlement and Agriculture, Central Provinces in 1902 before the Indian Irrigation Commission, will be of interest:—

“Most of the tanks and other sources of irrigation date from the period of native rule, and there seems no doubt that the number constructed under British Rule has decreased, although there are still many sites available. It will then be of interest to examine the method by which native rulers stimulated the construction of irrigation works. Under Marhatta rule, the farmers of villages had no security of tenure, but they were not disturbed when they made substantial improvements. The inducement was removed by the

British Government by the General conferral of Proprietary rights. The Marhatta ruler said, "Make a substantial tank, and I will give you security of tenure". The British Government said, "I give you security of tenure in the hope that you will now make a substantial tank in your own property". The gift has not been so successful as the promise. Under the Gond Kings, great encouragement to tank construction was given by the grant of the land irrigated on a quit-rent system known as a "Tukam". The quit-rent was nominally fixed in perpetuity, but was (in practice) some times raised. The quit-rent was generally lower than the rent which would have been paid at dry rates, but the Government gained by obtaining the nucleus of stable cultivation spread to other dry land. This system was continued by the Marhatta, and under it most of the large tanks of the Chanda District, now in Bombay State, were constructed."

6.3 Although a number of large irrigation works were constructed in the early part of the century, small tanks still constitute a very important source of irrigation in this State. Approximately $\frac{1}{4}$ th of the total irrigated area is from minor tanks. Particularly, districts of Balaghat, Seoni, Durg, Raipur, Bastar, Tikamgarh Bilaspur and Chhattarpur are studded with a number of small tanks. All these tanks were previously under the management of Malguzars and Jagirdars. With the enforcement of the 'Madhya Pradesh Abolition of Proprietary Rights Act, 1950; the management of these tanks passed on to the State. The Government has decided to repair all these tanks urgently and devlop irrigation from them as much as possible. The problem of eventual maintenance and management of the restored tanks has been discussed in a subsequent chapter.

6.4 Construction of large reservoirs and canal systems during the period 1910-24, was started on the recommendations of the Indian Irrigation Commission (1902). In the Central Provinces and Berar, Mahanadi, Tandula and Wainganga Canals were the first large-sized works to be taken up. In Madhya Bharat, construction of Tigra and Pagara Dams, Kotwal and Pillowa weirs for the Bind Canal system were taken up in 1913. Other major works viz., Aoda Dam and Harsi Reservoir in Gwalior State and Kharang and Maniari Tanks in Mahakoshal were constructed soon after.

6.5 Most of these works are storage reservoirs from which canals have been directly taken for irrigation. In some of the systems, advantage has been taken of the river flow also and the head works consist of diversion weirs with storage reservoirs on the tributary of the main river. When the river supplies fall, water is released from the reservoir into the river and is picked up at the diversion weir or by the irrigating canal. Examples of this kind of

Irrigation works are the Mahanadi and Wainganga Canals in Mahakoshal and Tigra and Pagara Dams with Kotwal and Pillowa weirs, which divert supplies in the Bhind Canal System, in Madhya Bharat.

6.6 In Gwalior region the Harsi and the Bhind Canals do irrigation of Kharif, Rabi and sugarcane crops and the returns on the capital outlay are 6.30 and 6.05 percent respectively (Appendix-11). These projects are thus productive. Canals in Chhattisgarh irrigate mainly Paddy. Although irrigation in the region is fully developed, the works are un-productive. Percentage return of revenue from old medium works ranges from 1.25 to 2.88 percentage the average being 1.9 per cent as in Appendix III-11. From smaller works the percentage return is still lower. Due to high cost of construction the percentage return of plan works under which irrigation has fully developed is very low.

6.7 The main systems of irrigation in the different regions merit description individually, as each has a history of its own.

(i) **Mahanadi canal-cum-Muramsilli reservoir.**—The construction of Mahanadi Canal in the Raipur district commenced in 1912 and was completed in the year 1927. The work originally consisted of an anicut across the Mahanadi River at Rudri, 4 miles south Dhamatari. Subsequently, the Muramsilli Reservoir was constructed on a tributary of the Mahanadi for supplementing the river supplies. This reservoir has a storage capacity of 5718 M.Cft. (161.93 Mcu.m.) of water. The total cost of Mahanadi Canal System is Rs. 156.59 lakhs. The project started irrigation in 1915-16 with a figure of 6757 acres (2737 ha) which progressively rose to 1.43 lakh acres (0.579 lakh ha.) in 1924-26. Subsequently, the slump in the market of food prices, due to the after-effects of World War I, affected this demand and the area irrigated declined to 0.65 lakh acres (0.263 lakhs ha.) in 1937-38. During and after World War II, the irrigated area has been steadily increasing, which in 1959-60 was 2.16 lakh acres (0.875 lakh ha). Due to pressing demand for extending irrigation facilities in the commanded area, the erstwhile Government of Madhya Pradesh undertook the construction of Dudhawa Project and Remodelling of Mahanadi Canals in the year 1953. When completed, the system will irrigate an additional area of 1.4 lakh acres (0.567 lakh ha.). The original cost of the unremodelled project per acre of irrigated area is quite low viz., Rs. 72.5.

Work in Chhattisgarh region.

(ii) **Tandula Reservoir.**—This is the biggest tank in the State and has a storage of 9712 M.Cft. (274.84 M.cu.m) It was constructed during 1910-21. The original cost of the project was Rs. 106 lakhs. The work started functioning in 1918 when 0.194 lakh acres (0.078 lakh ha.) was irrigated. There was no major fluctuation in the irrigated area till 1940-41 when it rose to 1.48 lakh acres (0.599 lakh ha.) In 1941-42, the irrigated area fell to 0.87 lakh

acres (38 lakh ha.) due to failure of rains. Since then it has been rising continuously and in 1958-59, it reached 1,64,000 acres (66.420 ha.). The original cost per acre of irrigated area works out to Rs. 66 per acre (Rs. 163 per ha.) only.

The popularity of the Tandula Canal can be judged from the fact, that due to pressing demand for increased irrigation in the commanded area, Gondli Feeder Tank Project was investigated in the First Five Year Plan. The work has since been completed. This tank has nearly $\frac{1}{3}$ rd of the capacity of Tandula. Due to rapid completion of the Bhilai Steel Works, most of the storage in the Gondli tank now meet the demand of the Bhilai Steel Project leaving only a small percentage for irrigation purposes. To meet the demand under the Tandula Canals, construction of another feeder tank called Kharkhara is under consideration of Government. Till 1957, the irrigation revenue was from water rates only giving a return of 2.1 per cent. Due to sale of water to the Bhilai Steel Plant, the revenue has rapidly increased.

(iii) **Wainganga Canal.**—The Wainganga Canal is a diversion scheme. It takes off from the Wainganga river at Dhuti, in Balaghat district, where a masonry weir has been constructed. The work was done during the period 1916-23 at a cost of Rs. 51.28 lakhs. The project started irrigating from the year 1918-19 when 31,000 acres (12,555 ha.) were irrigated. This area steadily rose to 0.56 lakhs acres (0.23 lakhs ha.) in 1928-29. Due to rise in price after World War II, the area under irrigation rose from 36.254 acres (14,682.6 ha.) in 1939-40 to 75,000 acres (30,373.7 ha.) in 1958-59. The capital cost of the project per acre is Rs. 72 (Rs. 178 per ha.).

A storage reservoir on Sarathi Nala with a capacity of 576 M.Cft. (16.128 M.cu. metres) was constructed to do independent irrigation of 8600 acres (3,483 ha.) and to feed the Wainganga Canal during the period of low supplies in the river. This work was also completed during the period 1912-23.

Gwalior Region.

6.8 (i) **Harsi Canals.**—The system consists of 2 dams—Harsi and Kaketo on the Parbati River. The work on both the dams was started in the year 1919 but remained suspended till 1927 when construction was taken afresh. The dams and the canals were completed at a total cost of Rs. 98.46 lakhs. The cost per acre of area irrigated is Rs. 100 per acre (Rs. 247 per ha.) The system irrigated an area of 49,000 acres (19,845 ha.) in 1938-39. The irrigated area varies from year to year but this is due to variation in the filling of the tank and is not on account of any apathy towards irrigation on the part of the cultivators. In the year 1958-59, the total irrigated area rose to 78,438 acres. The crop-wise distribution being Rabi, 40091 acres (16,230 ha.) Kharif 25453 acres (10,310 ha.) and perennial 12894 acres (5220 ha.).

(ii) Bhind Canal System—Tigara and Pagara, Dams, Kotwal and Pillowa Weirs.—The project was started in the year 1913 under the regime of His Highness Madhao Rao Scindia in order to give relief to the dacoit infested area of Bhind and Morena districts. The works were completed in the year 1927, at a cost of Rs. 116 lakhs. Total area irrigated in 1957-58 was 34300 acres, the break up being Kharif 19442 acres, Rabi 14308 acres and perennial 550 acres. The supplies are stored in Tigra and Pagara Tanks and are let through natural streams and picked up again by two diversion weirs at Kotwal and Pillowa, the total stored capacity being 12393 M.Cft. (349.57 M.cu.m.) The cost per acre of irrigated area works out to Rs. 143 (Rs. 358 per ha.).

6.9 (i) Bori Tank.—Bori Tank, situated in Chhindwara district, was constructed in 1927 at a cost of Rs. 10.67 lakhs to irrigate 6,277 acres (2542 ha.) of Kharif Crop. The net storage capacity of the tank is 353 M.Cft. (9.88 M.C.M.) and it irrigated nearly 7000 acres (2,835 ha.) in 1958-59 which exceeded the designed area. The cost per acre of irrigation is Rs. 152 (Rs. 375 per ha.). Medium Works
Mahakoshal Region.

(ii) Chichbund Tank.—This tank is situated in Chhindwara district. It was constructed at a cost of Rs. 13.17 lakhs in 1927 to irrigate 5000 acres (2025 ha.) of Kharif crop. It has a storage capacity of 274 M.Cft. (7.73 m.c.m.) Irrigation developed very quickly and has reached 5000 acres (2025 ha.). The cost per acre of irrigated area is Rs. 223 which is high.

6.10 (i) Palakmati Tank.—Situated in the Raisen district, this is the biggest tank in old Bhopal State and has a catchment area of 31 sq. miles (78.3 sq. Km.). The designed area for irrigation is 4000 acres (1620 ha.) which includes irrigation of all crops. The work was completed in 1935-36. A subsidence in the bund occurred later and now there is a limitation on the storage of water in the tank. Due to this, the area irrigated in 1958-59 was only 2000 acres (805 ha.). Medium Works
Bhopal Region.

6.11. (ii) Goratal Tank.—It is an old existing tank in the Chhattarpur district and is doing little irrigation. It has a good storage capacity and has been remodelled recently at a cost of Rs. 6 lakhs for irrigation of 4,000 acres (1620 ha.). Vindhya Pradesh.
Region.

Madan Sagar Jatara Tank.—This magnificent lake is situated in Jatara Tahsil of Tikamgarh District and irrigates a large area of 2000 acres (805 ha.). The maximum length of the massive earth dam is 3350' (1022 meters) and the height is about 40' (12.2 M.). The top width of bund is 150 ft. to 200 ft. (45.7M. to 61.0 M). The tank has a storage capacity of 433 M.Cft. (12.3 M.C.M.) and there is great scope of its development for which the work is in progress. It has got a good channel system and the waste

weir is located in a saddle. The fort and the rest house on the top of the bund give a good view of the picturesque lake and make it a fine picnic place.

Medium Irrigation
projects of the
Plan period.

6.12 The medium irrigation works which were taken up in the First Five Year Plan and have started yielding results are given in the statement below:—

S. No.	Name of Work	Name of District	Year of completion	Total capital outlay	Designed area Acre/Ha.	Area irrigated	Cost per acre/Ha.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Ari Tank	.. Balaghat	.. 1951	.. 27,28,526	10,500 (4252.5)	10,500 (4252.5)	259 (649)
2	Gondli Tank	.. Durg	.. 1959-60	89,14,000	7,614 (3083.67)	2,212 (396)	174 (429.3)
3	Sampna Tank	Hoshangabad	1957	.. 48,78,000	9,500 (3847)	3,503 (1419)	512 (1266)
4	Dukrikhedha	.. Do.	.. 1957	.. 39,09,000	6,600 (2673)	901 (365)	592 (1287)
5	Mola Tank	.. Guna	.. In progress.	36,45,000	7,000 (2835)	387 (156.7)	521 (1287)
6	Kunda Tank	.. Dhar	.. 1957-58	24,30,000	4,000 (1620)	500 (202.5)	607 (1500)
7	Jabera Tank	.. Jabalpur	.. 1957-58	11,17,000	2,250 (811)	497 (201)	500 (1235)
8	Simrar	.. Do.	.. 1958-59	13,48,000	5,000 (2025)	214 (97.6)	260 (642)
9	Dahod Tank	.. Raisen	.. 1957	.. 15,00,000	6,000 (2430)	2,064 (837)	250 (618)

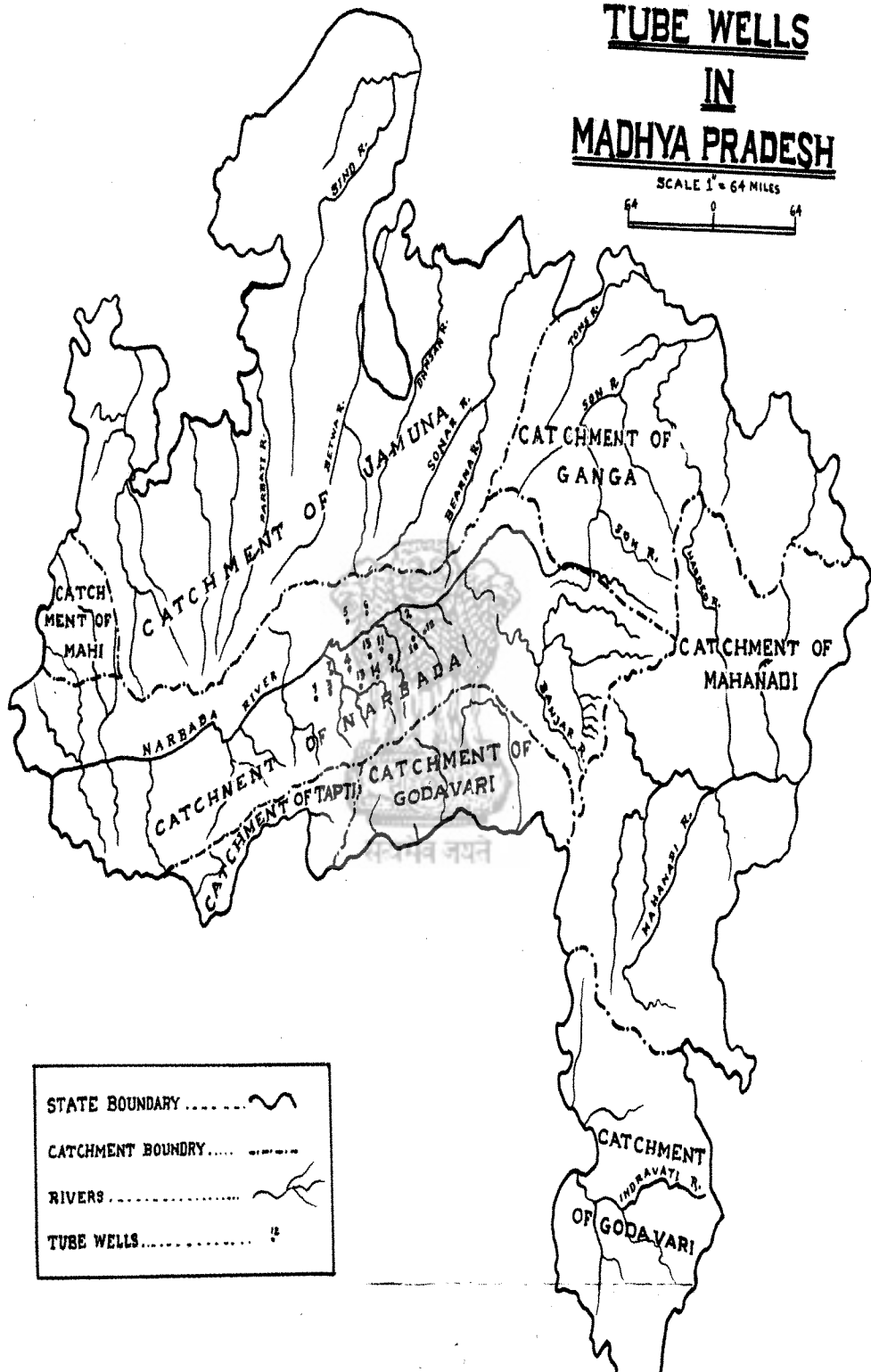
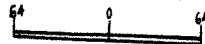
The development of irrigation under the plan works as exhibited by the specimen works in the table above is considered to be satisfactory.

Lift Irrigation
Schemes.

6.13 The lift irrigation in the State is done from (1) heavy duty pumps installed on Nala or river banks by Irrigation Department, and (2) small pumps installed by Agriculture Department. The Entkheri lift irrigation scheme on the Halali river in Bhopal and the Palakmati

TUBE WELLS IN MADHYA PRADESH

SCALE 1" = 64 MILES



STATE BOUNDARY ~~~~~

CATCHMENT BOUNDARY - - - - -

RIVERS ~~~~~

TUBE WELLS •

Scheme located on the spill channel of the Palakmati tank also in Bhopal are examples. At the Entkheri Station, five heavy-duty pumping-sets with total capacity of 8000 gallons (36320 litres) per minute have been installed, which are capable of irrigating of 4000 acres (1620 hect.). The irrigated area is reported to be 1000 acres (405 hect.) only. Similarly the Palakmati lift scheme has three large size pumping-sets each of 130 bph. The installation can irrigate more than 1000 acres (405 hect.) but the actual irrigation is reported to be only in 200 acres (81 ha.).

6.14 In Madhya Bharat region, a number of regulators and stop dams were constructed for heading up water to be lifted by pumps for irrigation. The Pat lift irrigation in the Agar Tahsil of Ujjain district is an example of departmentally managed lift irrigation scheme.

6.15. The development of irrigation from the lift schemes is slow. The water rates are high due to heavy expenditure on operation and maintenance. It generally costs Rs. 2 to lift an acre-inch (101.6 cm) of water by diesel pumps assuming normal lift of about 30 feet (9.12 M.). Ten acre inches (1016.c.m.) of water is needed for the irrigation of wheat crop and this gives the cost of wheat irrigation by diesel pumps as Rs. 20 per acre, which the cultivators find expensive. By electric motors, the cost is considerably less. Cultivators are, therefore, attracted to lift irrigation of wheat crop when cheap electric power is available in the vicinity. Irrigation of cash crops like sugarcane, tobacco, poppy, etc. is usually profitable and cultivators easily go in for lift irrigation for these crops. In view of the fact as areas under each crop are not situated in compact blocks, large lift irrigation schemes are not generally economic.

6.16 Under the All-India Exploratory Drilling Programme carried out with assistance of Technical Co-operation Mission, 16 tube wells were sunk on an experimental basis (Appendix II-5). The depth drilled ranges from 117 ft. to 960 ft. (35.5 in to 291.8 m). Some of them have given a yield of more than $1\frac{1}{2}$ cusecs (0.042 cum/sec.) The results of yield from these exploratory drillings encouraged Government to embark on a programme of drilling more tube wells during the First Five-Year Plan. Accordingly 40 new tube-wells are being drilled in the Second Five-Year Plan.

6.17 The tube wells are at present a losing concern because of the high lifts involved. The charges for operation and maintenance (see Appendix III-12) inclusive of depreciation and interest on initial capital outlay cannot be fully covered by the present water-rates. The economics of the scheme was considered by the representatives of the Government of India. Ministry of Food and Agriculture in a meeting held at Bhopal on March 9th, 1957. It was observed that if only the direct revenue was taken into account,

the tube-well programme like all other irrigation works in the State cannot be economic. However, increased production by irrigation, rise of the standard of living of cultivators resulting in increased tax paying capacity, were factors which could not be over-looked. It was also pointed out that the State should stand a good chance of getting substantial subsidy from the Government of India, because tube-well scheme was a new venture for Madhya Pradesh.

6.18 Well irrigation is extensively done in Chhatarpur, Tikamgarh, Mandsaur and Shivpuri districts, so also in Betul, Chhindwara, Raigarh, Ratlam and Nimar districts wells form the bulk of Minor Irrigation. The main crops under the wells are, cash crops like -sugarcane, Chillies tobacco. Wheat is the only food crop which is extensively irrigated from wells. Nearly 33 per cent of the State's irrigated area is under wells.

6.19 The geological formation of the State is not well suited to the tapping of ground water and most wells have supplies which can cope up with the irrigation of about 5 acres. The tract which can be considered as water bearing are limited to the alluvium of the Narmada Valley, Bhind and Morena districts, the sand-stone areas of Baghelkhand, Bundelkhand, and Gwalior and the Malwa Plateau where decomposed trap provides good storage for ground water.

6.20 Wherever the yield in wells is good, electric or diesel pumps have been successfully installed. In districts like Chhindwara where rural electrification has expanded, electric pumps are commonly seen. The devices mostly in use for lifting water from wells are the persian wheels both wooden and iron and the mote, and Dhenki. The former is used where the lift of water is 25 ft. (7.6 m) or less.

Submerging tanks.

6.21 The system of water conservation by means of submerging tanks is well-suited to the wheat growing districts of Gwalior, Bhind, Morena, Shivpuri, Guna and Vidisha. In the districts of Sagar, Tikamgarh, Chhattarpur, Damoh and Jabalpur, this system is also in vogue but, instead of submerging tanks the storage is done in small bundhis locally called Tagar Bandhias, Nar Bandhi, Bandhi, etc. We were informed that these bandhis are being constructed extensively in the adjoining districts of Uttar Pradesh. These works provide useful means of moisture conservation and are recommended for the districts mentioned above. Here the soil is 'Mar' or 'Kabar' and the moisture conserved serves the same irrigation purpose as paleo watering. After the rains, stored water is let out and the tank bed is emptied for cultivation.

6.22 Some times water stored in a submerged tank is utilised for irrigation of paddy crop lower down. The soil texture and rainfall conditions determine the feasibility of

both the crops being grown in the same tract, i.e., wheat in the tank bed and paddy as irrigated crop under the canal. This practice is common in Gwalior district.

6.23 This system of irrigation is practised in the sub-mountainous tract of Narmada Valley particularly in the two Nimar districts of Khargone and Khandwa, where post-monsoon flow is available in small nalas and is useful for irrigation of rabi crops. We were impressed by the work done by Shri Moti Mali of Barwani in Khargone district who explained to us that he under-took contracts for the survey and execution of these works. His judgement to construct works without the use of levelling instruments must be recorded as note-worthy.

Pat System of Irrigation.

6.24 Two methods of diversion of supplies are practised viz: (a) A cheap earthen bund which has to be constructed every year, and (b) Masonry diversion weir. Small channels running at a flat grade take off from one or the other side of the weir (bund), diverting the water to the 'Rabi' fields. In this tract, this is known as the 'Pat' system of irrigation. On account of good slope in the land, command is easily available within a short distance of the diversion bund. A number of such works, some in a state of dis-repair and some in actual operation could be seen in the East and West Nimar districts.

6.25 During the late Holkar State regime, several masonry diversion weirs were constructed to replace the temporary bunds. Most of the old diversion weirs have been out-flanked because they used to block practically the entire water way. With the construction of more and more of these works, their designs are being progressively improved.

6.26 Contour bunding is yet another useful method for moisture conservation and is very effective for checking the field erosion. These works are being planned and constructed in Vindhya Pradesh region.

Contour Bunding

6.27. Regulators are masonry structures having karries or gates for regulation purposes. They are generally constructed across small nalas and their construction is of comparatively recent origin in the State. The first regulator in the State was constructed at Sihora in Jabalpur district under the advice of our respected colleague Shri K. P. Pande, M.L.A., and under the technical guidance of Shri D. S. Sinha the then Executive Engineer. Shri Pande had to make great efforts to convince the officers of the irrigation department, regarding the efficiency of this cheap work typically suited to conditions met with in the district. The Sihora Regulator costing Rs. 33,000 only is the most successful work of this type and diverts water for flooding an area of 3,000 acres (1215 ha.). The siting of a regulator on a stream is to be done judiciously. The presence of a compact block of banded fields, a shallow stream with flat flanks

Flood Irrigation.

and easy gradient of the area to be flooded are suitable features. Diversion of floods towards the bunded fields provides (a) insurance against poor germination of the following rabi crop (b) growth of weeds is also retarded considerably (c) silt laden water possesses a manurial value (d) lastly the moisture content is retained long after rains and good Rabi crop is assured.

6.28 Regulators are being used now-a-days for flooding of rice fields as well. By this, the effect of break in Monsoon is generally tided over. These works are fast becoming popular and are being constructed all over the wheat zone of the State. Flood irrigation, when used in relation to kharif crops refers to what is practised in the Surguja and Bastar districts, which have heavy rainfall. From the several streams that traverse the area, the cultivators divert the flood water by through cross-bunds. No regular channels exist, but the cultivators so arrange that the diverted water generally follows the higher contours thus flooding comparatively large areas and incidently reducing erosion of soil. The cultivators achieve this by throwing more cross bunds across the passage of water and also by making the bunds along the boundary of low lying fields stronger in section. As a result the drainage line disappears and gets converted into fields. Even where big catchments have been diverted, the field bunds have stood remarkably well. Perhaps, the soil texture gives them the required resilience, but controlled flooding also helps the bunds to with-stand the impact of flood waters. Continuous flooding in the above manner, serves to correct rainfall irregularities to a great extent during the rainy season. In October, when the rains generally cease, there is still some flow left in the streams (how-so-ever small this may be) which when diverted to land already flushed with water, is good enough for maturity of the crop.

Tar Irrigation.

6.29 In Chhatisgarh region where regular irrigation from tanks is not available, cultivators intercept the rain water flowing across side long ground by the construction of a 'Tar'. This is a single bank channel cut across side-long ground and is intended to carry the stream water into the paddy fields, for supplemental irrigation.

6.30 Irrigation from the Spill way waters of low percentage tank is practiced in Raigarh and Bastar districts. The spilled water is canalised to flow into the paddy fields.

CHAPTER VII.—DIRECT AND INDIRECT BENEFITS AND COST OF IRRIGATION WORKS

7.1 The benefits which flow from irrigation enter- Introduction.
prises are manifold. Important irrigation works like a big canal system have a far reaching effect on the economic life of a community within a region and also on the community living outside it. The direct benefits from a canal system are to put previously cultivated land to new uses or to make them more productive or to bring the fallow area under the crop, while the indirect benefits are reflected in increased economic activity viz., processing of the agricultural produce, transportation, etc. Irrigation works also serve as pioneer works for multipurpose development of water resources.

7.2 The direct benefits of irrigation are summarised Benefits of Irrigation.
as below :—

- (a) Irrigation affords a fair degree of security by making cultivation independent of rainfall and its vagaries.
- (b) It leads to increased yield of crops.
- (c) It enables cultivation of better varieties viz., late varieties of rice, superior varieties of wheat and long staple cotton and good quality of sugarcane etc.
- (d) The silt deposited by canal water has got manurial properties.
- (e) Use of regulated canal supplies is essential for economy in use of fertilizers.
- (f) Double cropping becomes possible only when irrigation facilities exist.
- (g) For growing sugarcane, Garden crops and Pan garden irrigation is essential.

7.3 Other items of importance, besides irrigation and power, are water supply and flood control. Direct benefits from water supply are realised by the sale of water to industrial concerns and Municipal corporations etc. Not of lesser importance is the indirect benefit by control of epidemics which spread due to shortage of water supply in villages. In Chhattisgarh several villages depend on tank water for drinking purposes. These nistar tanks in the command of an irrigation canal are filled from state irrigation works. Irrigation works also serve as flood control works as they have a substantial moderating effect on the intensity of floods.

7.4 While the advantages of irrigation enumerated Limitation of Realisation of Irrigation benefit.
above are incontestable, it can not be disputed that accrual of these benefits in full measure depends upon a variety of circumstances e.g., character of rainfall. development of

country, nature of soil, system of agriculture and resources of the people, etc. We will, therefore, only enumerate to what extent such advantages are likely to be turned into profitable account in areas under various irrigation works in the state. (See statement of cost and benefit appendix III-13).

Utility of Irrigation
for rice crop in
various tracts.

7.5 In the rice tract viz., the districts, of Raipur, Bilaspur, Durg, Bastar, Balaghat, Surguja, Shahdol, Sidhi, Mandla and Raigarh, which produce 81.50 per cent of rice in the State, rice is sown as kharif crop during the period from the 15th June to 15th November. In the five wet months, June to October, the rainfall in this region varies between 50 to 57.0 inches (1270 to 1448 mm) on an average and if well distributed, is sufficient to produce a good crop of rice. (See Appendix III-2).

7.6 We have seen that the rainfall is many a time capricious in character. This is clear from the duty of records that have been prepared for the past 50 years. The early cessation of monsoon is detrimental to the yield and this necessitates irrigation for the final watering needed to bring the crop to maturity. During the past 50 years, 20 such failures occurred of which 12 were severe or very severe type (See Appendix III-6). The experience is that the cultivators can hardly make up for a short or late rainfall or a long spell of no rainfall in the season by the use of petty irrigation sources like small tanks or wells. The area fully protected by an ordinary village tank is usually very limited and a deficiency of even a few inches of rain or its delay by ten days or so, may do great damage. The rainfall, though ample, is not always evenly distributed and deficiencies in the critical periods are fatal. Occasional failure of monsoon in an area, which is so dependent on rainfall for cultivation, completely upsets the balance of agricultural economy with its serious repercussions on the overall economy of the region. That irrigation facilities in such circumstances should be provided, to afford an insurance against partial or complete failure of crops, needs no emphasis.

7.7 The benefits of irrigation in the districts mentioned in para 7.5 apply *mutatis-mutandis* to other rice growing districts of the State viz. Jabalpur, Seoni districts of Mahakoshal, Rewa and Satna districts of Vindhya Pradesh, and Gwalior, Bhind and Sheopuri districts of Madhya Bharat. In Madhya Bharat region, number of years of early cessation of monsoon and severe and very severe types of droughts are observed to be twice as many as those in Chhattisgarh tract. In spite of the deficient rainfall in this region yield of rice crops is maintained at the same productivity level, as attainable in Chhattisgarh, by transplantation method of cultivation.

7.8 In para 2.25 we have observed that in Chhattisgarh tract, main soils are Kanhar, Dorsa, Matasi and Bhata. These soils react somewhat differently to irrigation. In a year of normal rainfall the Bhata soil gets the greatest

benefit due to irrigation while Kanhar soil gets the least. On Bhata soil nothing can be grown except mullets without irrigation while yield of crop in Matasi and Dorsa soils improves considerably with irrigation. The need for irrigation supplies under the circumstances is immense and can not be overlooked. Actually with availability of irrigation water, area under inferior crops is converted into rice area. Sample surveys of expansion of the rice cropped area have been made in the Kanki and Mandhar Sub-Divisions of Mahanadi canal. Records for 10 villages in each Sub-Division were taken. In the Kanki Sub-Division expansion was noted for the period 1937-38 to 1957-58. In sample village Gujra, the irrigated area in 1937-38 was 298 acres (120 ha) while in the year 1958 it rose to 495 acres (200 ha.) registering an increase of 69 per cent due to irrigation facilities which indicates a rise of 3.5 per cent per year. The average expansion in villages selected at random is 1.4 per cent per year. In Mandhar Sub-Division expansion has been still more rapid and an average of 3.7 per cent per year has been realised. Average of the two Sub-Divisions works out to 2.6 per cent per year. In non-irrigated area expansion has no doubt also occurred and this is estimated to be 0.5 per cent per year as seen from the records of the neighbouring Raigarh district. The net expansion in the irrigated area is more rapid. Figures for other large canals could not be made available but observation shows similar effect at other places too. Similarly in Gwalior and Bind districts there is rapid conversion of wheat grown areas to rice area wherever irrigation facilities have been made available. In other districts of the State where rice is grown on any appreciable scale viz. Jabalpur, Rewa, Panna, Sidhi, there is room for expansion of rice cultivation provided irrigation facilities are made available.

7.9 Early varieties of rice are grown where irrigation facilities are not available but with the security of assured irrigation supply they are progressively replaced by medium and late maturing varieties. It is common knowledge that yield of paddy crop depends mainly on the number of days the crop is in the field and precisely for the same reason the medium and late varieties now being grown in the irrigated area produce at least 50 per cent extra crop.

7.10 We have so far referred to the benefits in the produce of rice crop under existing conditions of rainfall and soils met within the State. Benefits of produce depend to a considerable extent on other factors also viz., (i) system of crop cultivation (ii) resources of cultivators and (iii) development of the tract. In a nut-shell the impact which these circumstances bring on the cultivation of rice is clear from the Japanese method of cultivation, where produce (and hence the benefit) multiplies fourfolds. These improved methods are gradually replacing the primitive methods of rice cultivation and there is no reason why yield of this crop in the State should not reach the level of production of other advanced countries in future. We have

been informed during our tours from reliable witnesses that the increase in yield of rice due to irrigation is about 400 lbs. per acre (448 K. gm per ha.) in normal years of rainfall. (See appendix III-14 (b)).

Cultivation of Utera crop or pulses (Nami Dhan).

7.11 In irrigated rice fields with heavy soil, after harvesting of rice advantage of dampness is taken to sow 'Utera' crops or pulses. These leguminous crops are immensely beneficial in fixing the depleted nitrogen of the soil. On a moderate estimate benefit due to extra yield of the crop is Rs. 31 per acre (Rs. 76.57 per ha.).

Utility of Irrigation for wheat crop.

7.12 We next proceed to examine the advantage of irrigation to wheat crop details of which are given at appendix III-14 (a). This crop, as described earlier, thrives best in the Narmada Valley and Malwa Plateau under rainfed conditions. The extra yield due to irrigation is marked in Tikamgarh and Chhattarpur districts under private irrigation from wells, and under State irrigation works in Gwalior, Bhind and Morena districts and Chandia Nala tank in Sagar district.

Character of the soil and extent to which Irrigation is required for wheat crop.

7.13 Under rainfed conditions, average yield during the three years 1955-58 was poor and ranged between 339 to 531 lbs., per acre (378 to 265 Kg. per ha.) which is very low as compared to the yield obtained in other States. It clearly calls for introduction of improved system of cultivation of the crop as proved by research and experiments made at the Powerkheda Farm (M P.) where different experiments were conducted by Sarvashri Verma and Ekbote, Wheat Specialist to Government of M. P., on the following lines :—

- (1) Water-cum-Manurial requirement of wheat crop.
- (2) Cultural practices-cum-fertilizers application.
- (3) Varietal-cum-seed-rate-cum-manurial requirements under irrigation.
- (4) Lay out of fields, their size and slope .

These experiments have conclusively proved that if the fields were properly lain out and water courses constructed, there should be no fear of water logging and consequent danger of rust, provided rust resistant varieties viz. Hybrid-65 and P-591 were used. The results of these experiments are gratefully acknowledged and are reproduced at Appendix III-15.

7.14 The above experiments give an idea of great increase in the yield of wheat crop due to irrigation, but in order to co-relate it with the actual practice in field, searching enquiries were made by us from the cultivators during our tours. The replies obtained are widely divergent as compared to rice irrigation and the reason thereof is not far to seek. Wheat is grown under varied conditions of rainfall and soils. Besides where cultivators' finances permit, they bund up the fields (notably in Haveli tract of

Jabalpur district and in Gwalior district) for moisture conservation. Last, though not the least, important factor which may be mentioned is the great divergence in the atmospheric temperature during the period of crop growth in various regions of the State. We find that due to combination of these causes average yield of wheat is the highest in the districts of Narmada valley, i.e., 7.0 Mds. (6.45 quintals) and the lowest in Chhattisgarh, viz. 4.8 Mds. per acre (4.42 ql. per ha.) [See App. III-14 (a)].

7.15 Experiments reveal that two waterings of irrigation raise the yield to twice the dry yield while a single watering improves it by 1.5 times. The requirement of water for wheat crop is much less as compared to rice. Advantage due to irrigation per acre (per ha.) in the various districts is given in the following table [For details see Appendix III-14 (a)]:—

S. No.	Name of Rain fall station	Name of district under influence	Average Rain-fall during the period (Nov. to Feb.)	Irrigation advantage in mds. per acre (per ha.)	
				Cultivator's opinion Mds./Acre	Average of all source & Mds./Acre (Ql./Hect.)
(1)	(2)	(3)	(4)	(5)	(6)
1	Gwalior	.. Gwalior, Bhind, Datia, Morena, Tikamgarh, Chhattarpur, Shivpuri.	1.46 in (37.1 mm)	5.0 Mds.	7.2 Mds. (6.63 Ql.)
2	Jabalpur	.. Jabalpur, Damoh, Sagar, Narsinghpur, Seoni, Chhindwara.	1.95 in (74.9 mm)	6.0 Mds.	5.0 Mds. (4.61 Ql.)
3	Raipur ..	.. Raipur, Bilaspur, Durg, Raigarh, Surguja, Balaghat, Mandla.	1.56 in (39.6 mm)	3.0 Mds.	2.7 Mds. (2.48 Ql.)
4	Indore ..	.. Indore, Mandsaur, Dhar, Ujjain, Ratlam, Dewas, Rajgarh, Shajapur, Jhabua.	1.34 in (34.01 mm)	6.0 Mds.	5.5 Mds. (5.06 Ql.)
5	Bhopal ..	.. Hoshangabad, Raisen, Vidisha, Shohore, Betul.	1.77 in (45.0 mm)	6.0 Mds.	4.9 Mds. (4.51 Ql.)
6	Satna ..	.. Rewa, Satna, Panna, Sidhi, Shahdol.	3.06 in (77.7 mm)	4.5 Mds.	4.6 Mds. (4.24 Ql.)
7	Jagdalpur	.. Bastar	1.28 in (32.5 mm)	N.A.	6.0 Mds. (5.53 Ql.)

* The districts noted in Col. 3 receive average rainfall of the rainfall station given in Col. 2.

7.16 Sugarcane in the State is generally sown in December and January and it is a 10-12 month crop. The total yield of the crop during the year 1958-59 was estimated at 1,13,600 tons (1,15,460 m. tonnes) in terms of Gur cropped over 1,09,000 acres (44,140 ha.) (average Sugarcane ratio being 1:10, The average yield per acre works

out for the State as a whole to 2834 lbs., per acre (3177 K gm. per ha.). This is an irrigated perennial crop and yield of crop depends largely upon the cultural operations employed, resources of the cultivators, fertilizer and irrigation applications. The cultivators in the areas where sugarcane factories are working in the State, have an advantage over those in other areas where the cultivators have either to make 'Gur' or sell cane. The benefits enjoyed by cultivators close to a factory are :—

- (1) Advances issued by factory owners to cultivators to purchase fertilizers and other farm implements.
- (2) The price of cane at factory gate are assured as they are generally fixed from year to year in advance of sowing season.
- (3) Consequent to above, in such localities, improved technique of cultivation is followed by the cultivators.

7.17 In Madhya Bharat and Bhopal regions the working sugar factories have for their use 27,000 acres (10,940 ha.) of cane which is crushed in the mills. Our Chief Minister, Dr. Katju, while inaugurating the State Sugarcane Board in Bhopal on September 19, 1960 observed that steps should be taken to promote the cultivation of sugarcane, as increased sugar production helps the need of foreign exchange, required badly for the implementation of the Plans. He observed that sugarcane cultivation not only benefits the farmer but creates employment which is clear from the fact that by installation of sugar factory at Jaora, Sugarcane area had risen from 100 bighas to 3,000 bighas (20.87 ha to 626 ha).

Yield of sugarcane.

7.18. No experiments have been conducted by the Land Records Department to determine the yield of this crop, which fluctuates with the culture and manuring. From the recorded evidence of witnesses, we consider that the yield per acre (per ha) of 'Gur' for irrigated sugarcane is 54.34 md (50.06 ql.) and that of unirrigated sugarcane is 18.45 md (17.00 ql) (See details in Appendix III-14 (c).

The additional net benefit of sugarcane is calculated below :—

	Rs. per acre	Rs. per ha
Total Value of irrigated crop	994.00	2,254.00
Expenditure on raising irrigated crop	503.00	1,244.40
Net profit	491.00	1,213.00
Value of unirrigated crop	322.00	795.34
Expenditure on raising unirrigated crop <i>vide</i> App. III-17 (c).	167.000	412.50
Net profit	155.00	382.85
Additional net benefit due to irrigation	336.00	1,039.87

7.19 The common belief has been that cotton which is largely grown in the black cotton soil, suffers more from moisture than lack of it. Cotton is also a crop which suffers less than any other crop due to early cessation of rains. From these view points it would be clear why irrigation of cotton has remained in the back ground so far. From the figures of crop cutting experiments as supplied by the Director of Land Records average yield of irrigated cotton is 326 lbs per acre (365 kgm per ha) which is 2.5 times the normal dry yield. The cotton producing districts arranged in descending order of production are West Nimar, Shajapur, East Nimar, Rajgarh, Dhar, Ujjain, Dewas, Ratlam, Mandasaur, Jhabua, (see chart at Appendix IV-6). The soils in these districts are deep black cotton soils which retain enough moisture for the growth of cotton. The varieties generally sown are, Malvi, Jarilla, H-420, Burl (American Variety).

Irrigation of Cotton.

7.20 There is no easy way of measuring accurately the full indirect contributions which irrigation works make to the economic and social life of a community. The most prominent effect is the increase in land value. The processing industries, e.g., rice mills, flour mills, oil mills, ginning and sugar mills are established after irrigation works start operating. Other indirect effects are the increased production resulting from the projects which greatly accelerate the commercial activity, as the residents in the project area are buyers and sellers of the vast amount of goods and produce. In the wake of construction and development of projects there is an improvement and increase in both highway and rail transportation. Irrigation Projects provide means for colonisation and better employment for the rural population. They frequently serve as multipurpose projects by way of moderating floods, giving scope for hydro electric power development and providing space for pisci-culture operations. At places they serve for supply of water for navigation channels and incidentally raise the water table by regenerating the sub-soil flow. Where irrigation on large scale is practiced, it is observed, that the live stock industry develops rapidly.

Indirect benefits of Irrigation.

Such around economic development results in the increased paying capacity of taxes by the public. Irrigation projects also contribute a major part to the establishment of schools, banks, hospitals and other social welfare centres.

7.21 Most of the irrigation works in this State when started originally were in the category of protective irrigation works. The permissible cost per acre of a protective work was fixed according to the extent to which the area was liable to be affected by famines. The erstwhile Central Province was then divided into four such tracts, viz., (1) Deeply depressed rice tract (2) rice tracts which suffer considerably from drought (3) Mixed rice and wheat tract requiring irrigation (4) Ordinarily secure tracts. The

Benefits as famines relief works.

permissible cost per acre for the protective work was fixed as follows for the different cases vide page 46 of the Irrigation Manual of Central Provinces and Berar :—

Tract 1—Rs. 150.00 per acre Rs. 370.50 per ha.

Tract 2—Rs. 200.00 per acre Rs. 240.00 per ha.

Tract 3—Rs. 78.00 per acre Rs. 192.60 per ha.

Tract 4—Rs. 62.00 per acre Rs. 153.14 per ha.

The above rates included a sum of Rs. 30.00 per acre (74.10 per ha) to represent the capitalised value of probable receipts less the probable cost of maintenance. The average cost of all classes of famine works thus worked out to Rs. 67.50 per acre (Rs. 167 per ha) which at present level of prices worked out to Rs. 338.00 per acre (Rs. 835.00 per ha).

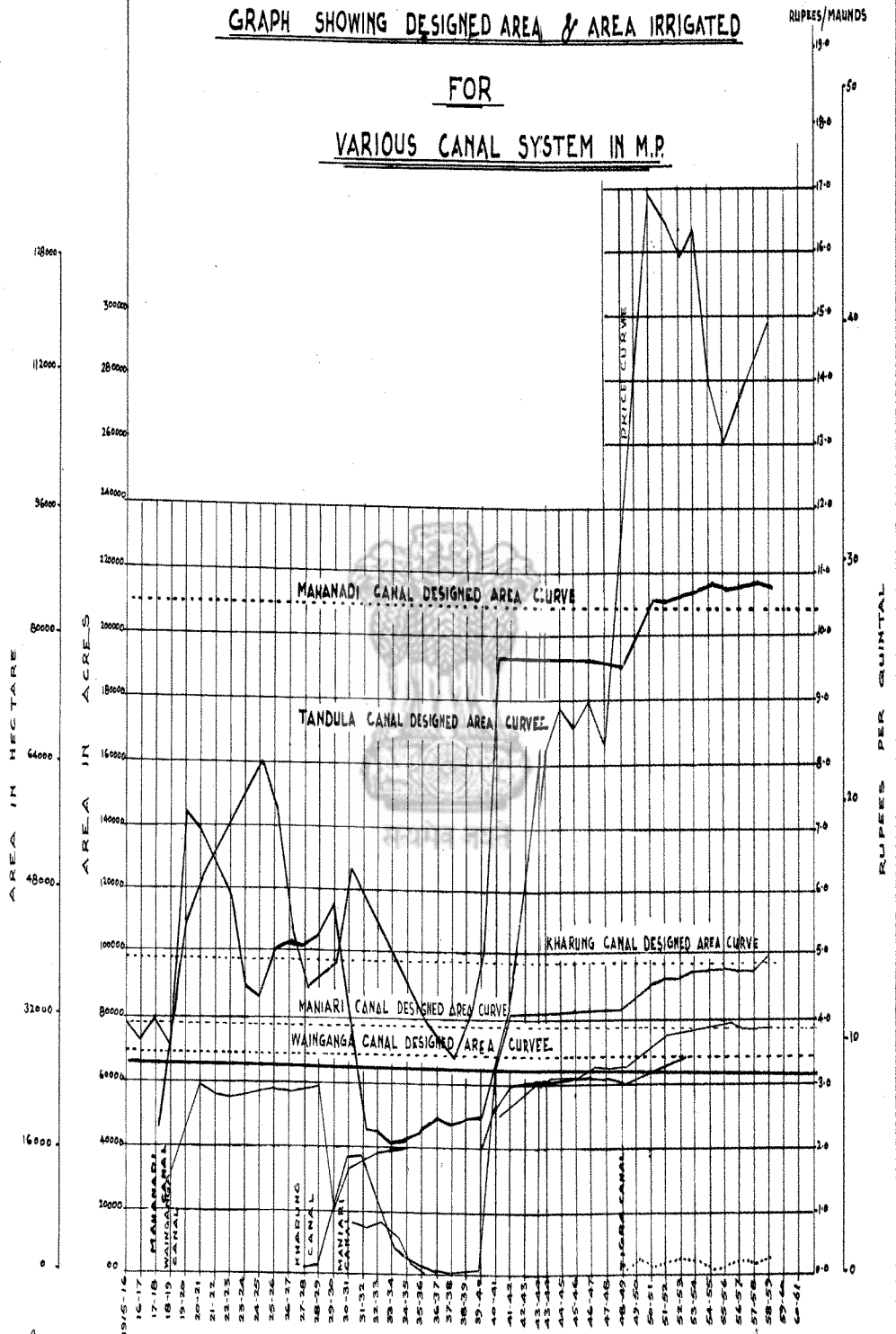
Cost of Irrigation
works.

7.22 In the State there are large size canal systems, medium and minor irrigation schemes, besides a large number of petty irrigation works including Bandharas, regulators, pick-up weirs with and without supplementary storage, village tanks, lift schemes on deep and shallow wells and on rivers with manual lift appliance, e.g., persian wheels etc. This covers a wide range of works and naturally there is large variation in the capital cost per acre. On the score of cost (not necessarily the cost per acre) small irrigation work stands at a premium, although it is obvious that the very scattered location of these works would result in their rapid deterioration for want of proper supervision. Individual examination of flow irrigation works of different categories, major (large canals), medium and minor works show that the benefit|cost ratio which is the only rational yardstick for assessing the relative importance from the investment point of view, is the highest for Harsi canal system and is the least for Chandia-nala tank. The reason is that the balanced crop pattern under the Harsi Canal i.e., irrigation of Kharif, rabi and perennial crops, results in large farm produce value, giving a higher benefit|cost ratio. The case is just the opposite with lift irrigation schemes. The flow works as a class are considered to be superior for irrigation of kharif, rabi and cane crops. These are generally more reliable in meeting the demand of irrigation. The small irrigation works serve the irrigation requirements more or less in the same way as the bigger works, but these can not be relied upon as much as the large works.

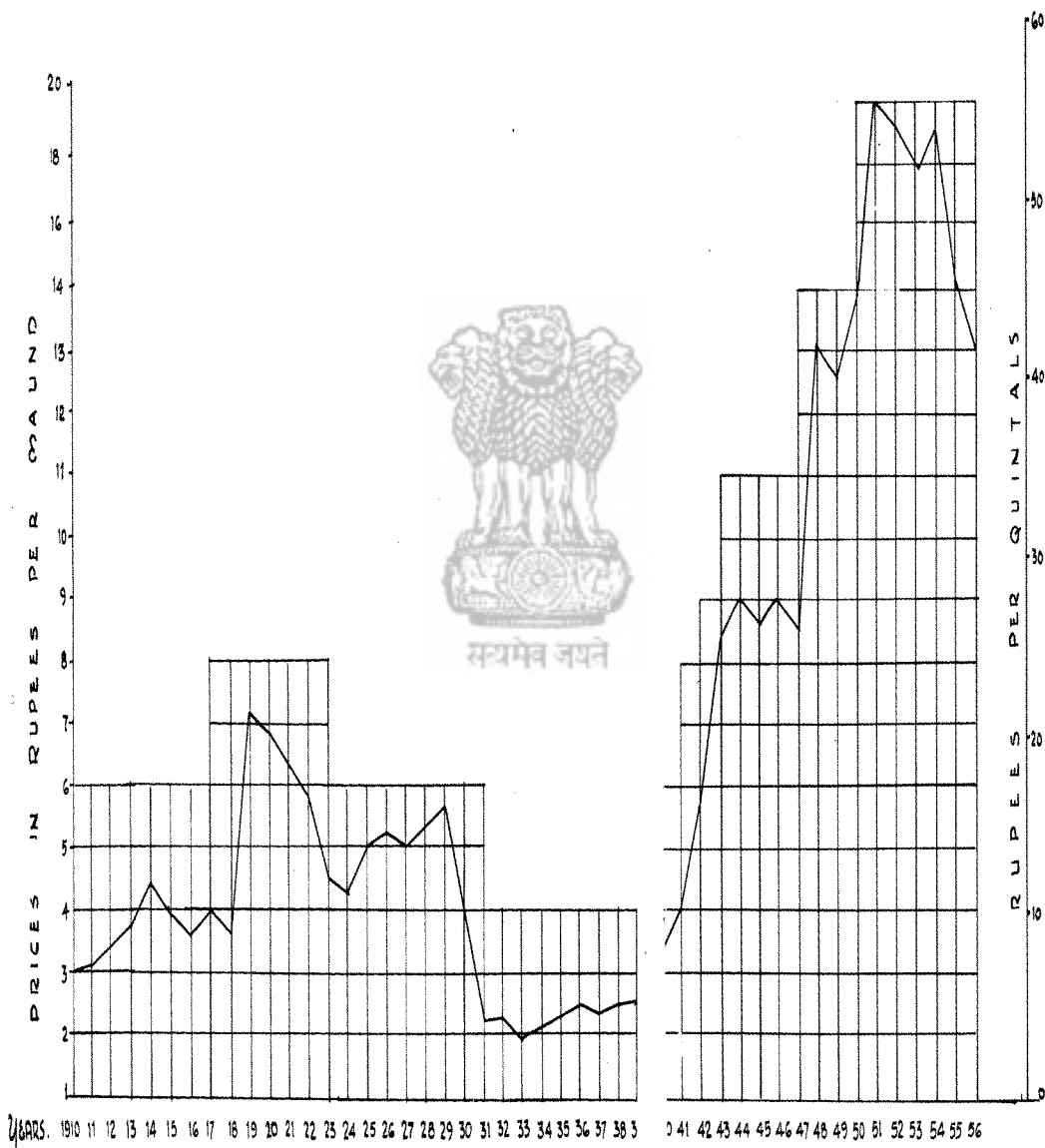
On account of the quick results that these (minor irrigation) works produce, their easy construction without machinery or heavy tools and plants requiring foreign exchange and possibility of their siting at different places they have assumed importance in the present day irrigation programme. The benefit|cost ratio for all types of works as given in the statement Appendix III-13 is based on a normal year's rainfall.

GRAPH SHOWING DESIGNED AREA & AREA IRRIGATED

FOR VARIOUS CANAL SYSTEM IN M.P.



TREND OF WHOLE SALE PRICES OF COARSE RICE IN RAIPUR MARKET OF MADHYA PRADESH



Traced by *[Signature]*

CHAPTER VIII.—HISTORICAL REVIEW OF PRICES OF PRINCIPAL CROPS

8.1 During our tours we made a study of the areas under different crops and areas irrigated from year to year under several projects. We noticed great variations between the designed area and area actually irrigated. We were told that although there was no complaint about irrigation supplies, the utilisation had considerably lagged behind mainly due to slump in the prices of farm produce during the period 1926-42. Introduction.

8.2 In order to compare the total demand for irrigation under principal canal systems vis-a-vis the rise and fall of prices of staple food crops, viz., rice and wheat, we have prepared a chart given at appendix IV-9. Prices of produce and area irrigated.

The areas actually irrigated from year to year from the canals in Mahakoshal, varied considerably although supplies in tanks were available as against the keen demand for irrigation under the Harsi and Bhind Canals in Madhya Bharat for reason explained in the foot note.

In the year 1937-38, the demand for irrigation was the lowest being only 31 per cent of the designed area for Mahanadi Canal and 60 per cent and 53 per cent for the Tandula and Wainganga Canals respectively.

The graph of prices (rice) shows that the prices ruled low during the period 1931-32 to 1939-40 corresponding to the period when the irrigation area was very low or nearly so.

8.3 Prices of the principal irrigated crops for periods given in parenthesis, e.g., wheat (1910-59), rice (1910-59), sugarcane (1928-60) and cotton (1906-59) have been studied in details. Selected market centres viz. Raipur for rice, Sagar and Gwalior for wheat, Sehore and Gwalior for sugarcane and Bombay for cotton have been chosen.

8.4 Data of wholesale prices of rice for the period 1910-57 have been compiled from (a) Season and Crop Report and (b) Statistical Abstract of Madhya Pradesh. The whole period is divided in groups of years of average prices ruling in that period. The chart at Appendix IV-10 gives the prices of rice. Prices of rice.

Foot Note.—(a) The rise and fall in graphs of canals in Mahakoshal region indicates that demand for irrigation water started decreasing continuously from the year 1931-32 onward. After 1939-40 the demand has been increasing continuously and has touched the designed figures. This phenomenon indicates that popularity of irrigation depends on the prices of produce.

(b) In Madhya Bharat region the Bhind Canal came into operation in 1927 and as the canal is constructed in arid regions, demand for water has always been keen. Similar is the case of Harsi Canal which came into operation in 1937.

(a) **1910-13.**—Before the First World War, the prices ranged from Rs. 3.00 to Rs. 3.62 per maund (Rs. 8.00 to Rs. 9.70 per Q1) at Raipur. The average rate was Rs. 3.25 per md. (Rs. 8.71 per Q1). Due to low out-turn in years 1912 and 1913 the prices had risen.

(b) **1914-18.**—The prices ranged from Rs. 3.50 to Rs. 4.37 per md. (Rs. 9.37 to 11.71 per Q1) the average being Rs. 3.87 per md. (Rs. 10.34 per Q1). The rise in prices was due to less production in the year 1913-14 resulting from pest menance and to a certain extent due to World War I, which pushed up the general level of prices of all commodities.

(c) **1919-22.**—This was a period of inflation after the World War and rise in prices was in sympathy with the general trend in market. During this period demand from outside also increased and served as an additional factor for rise in prices. The prices ranged from Rs. 5.87 to Rs. 7.19 per md. (Rs. 15.69 to 19.26 per Q1). Average being Rs. 6.62 per maund.

(d) **1923-30.**—In 1923, the prices declined considerably and they remained more or less steady till 1930. Fluctuation was moderate and depended mainly on factors of supply and demand. Average price was Rs. 4.94 per md. (Rs. 13.23 per Q1).

(e) **1931-39.**—In the year 1931 there was a world wide collapse of prices of all commodities and consequently rice also suffered very badly. Prices in 1933 dropped down by 46 per cent at Raipur. During 1931-33 the prices ranged from Rs. 2.06 to Rs. 2.50 per maund (Rs. 5.52 to Rs. 6.69 per Q1), the average price being Rs. 2.37 per maund (Rs. 6.30 per Q1).

(f) **1940-43.**—In the period 1939-40 to 1941-42 rice crop in the State gave unsatisfactory out-turns and consequently its prices assumed an upward trend. In 1942 the effect of World War II on the trade became visible and the period of inflation set in. In addition to this, the Japanese invasion on Burma prevented import of Burmese rice to the deficit zones. This increased the pressure on local rice and prices rose. In order to check this the Government decided to stop all unrestricted purchases and exports. During the early part of 1943, measures both direct and indirect were taken to control the prices and export of rice. This had a stabilising influence on the prices. The average price during the period rose to Rs. 5.31 per maund (Rs. 14.22 per Q1), which registered 133 per cent increase in price ruling during the lean price period of 1931-39.

(g) **1944-47.**—In December 1943, the Government fixed the ceiling price of rice and took over the trade of rice in their hands. Monopoly procurements were started in all important rice markets. A scheme was launched for provisioning the important consuming centres by selling rice at cost price through controlled shops for equitable distribution, which resulted in maintaining the rice prices at a

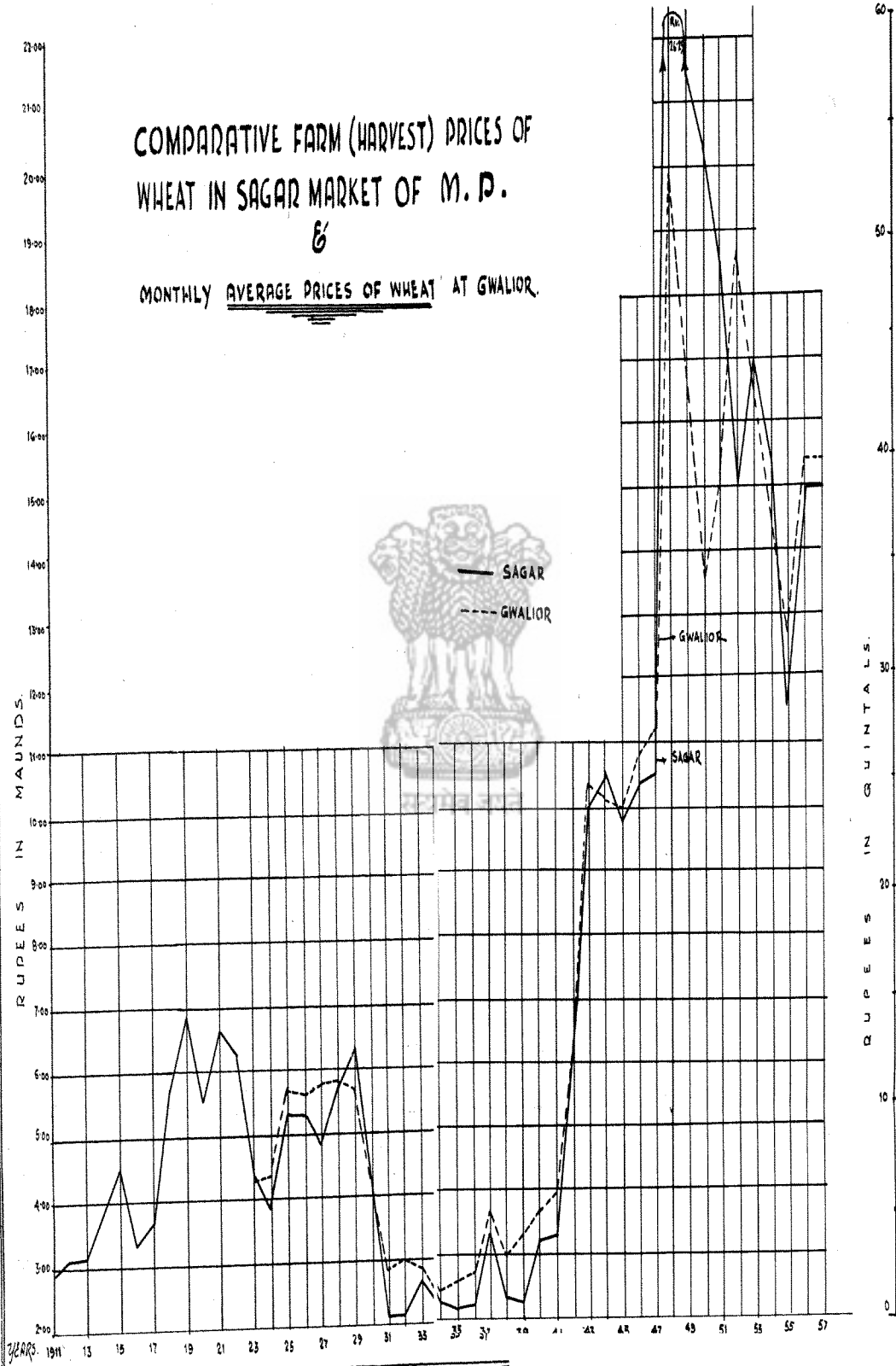
COMPARATIVE FARM (HARVEST) PRICES OF WHEAT IN SAGAR MARKET OF M. P.

&

MONTHLY AVERAGE PRICES OF WHEAT AT GWALIOR.

RUPEES IN MAUNDS.

YEARS



particular level, both in producing as well as in consuming zones. In keeping with the increase in demand of rice, both in the State and outside, and due to the successive failures of wheat crop in the State and general shortage of food-grains in other State, the Government revised the prices of rice from time to time. The result of monopoly trading was that its prices were free from fluctuations and remained practically steady throughout the period. The average price in the four years was Rs. 8.69 per maund (Rs. 23.27 per Q1).

(h) **1948-57.**—The Government declared the policy of progressive relaxation of controls on food-grains but they retained the power of requisitioning the stocks from the cultivators. They ordered an increase in the procurement price of Rs. 1.75 per maund (Rs. 4.69 per Q1) over the prices ruling prior to the relaxation of controls.

Immediately after the decontrol there was an increase in prices in the open market. This continued throughout the year 1948 and prices fluctuated from month to month. Coarse rice was sold at Rs. 11.50 to Rs. 13.00 per maund (Rs. 29.60 to Rs. 34.83 per Q1) showing a rise of Rs. 0.81 to Rs. 2.31 per maund (Rs. 2.17 to Rs. 6.19 per Q1). The highest price touched was in the month of August.

In the year 1948-49, the prices declined slightly but again rose in 1950 and continued to rise till 1952-53 till it reached Rs. 15.95 per maund (Rs. 42.00 per Q1) and were steady for the next two years.

The prices then declined and average in the year 1955-56 was Rs. 12.87 per maund (Rs. 34.46 per Q1). This decline was, however, short-lived as the prices rapidly shot up in 1956-57 and ruled as high as Rs. 20.00 per maund (Rs. 53.58 per Q1) at Bilaspur.

8.5 Data of wholesale prices of wheat for the period 1910-57 has been studied. A graph showing the prices is given at Appendix IV-11. The period can be suitably broken as follows:— Prices of wheat.

(a) **1910-20.**—Due to low out-turn the prices rose from Rs. 2-13-0 to Rs. 4-8-0 per maund (Rs. 7.53 to Rs. 12.05 per Q1) in 1914-15 in the Sagar market. The upward trend was maintained during the period of World War I and the zenith of price was reached in 1918-19 when it was Rs. 6.15 per maund (Rs. 18.58 per Q1). In 1919-20, the prices fell slightly, but during the next year they improved. the increase was due to poor harvest.

(b) **1921-22 to 1926-27.**—Due to gradual increase in World production of wheat, the prices fell from Rs. 6-4-0 to Rs. 4-13-0 per maund (Rs. 16.74 to Rs. 12.89 per Q1). In the two following years the prices again rose due to State-wide attack of rust on the crop.

(c) **1929 to 1938-39.**—The slump in prices set in and they remained low till the commencement of World War II (1938-39). The average price during the quinquennium ending 1938-39 was Rs 3.00 per maund (Rs. 8.04 per Q1) and were normal because during this period the average production and trade remained almost stabilised. Prices were within easy reach of the consumers. Although the war started in 1939, the price level was not much upset during the years 1939-40 and 1940-41.

(d) **1941-42.**—In 1941-42, prices began to show an upward trend and a climax of prices unheard of in history was reached during 1942-43 and 1943-44. Wheat was sold at exorbitant price in December, 1941. It was Rs. 4-6-0 per maund (Rs. 11.71 per Q1) in the wholesale markets of Lyalpur and Hapur. To discourage speculation, Provincial Government issued the orders fixing the prices in the consuming markets in parity with price at Hapur. In May, 1942, the wheat control order came in force all over India. This order restricted inter-provincial export of wheat, but these restrictions could not prevent rise in prices and stocks went underground.

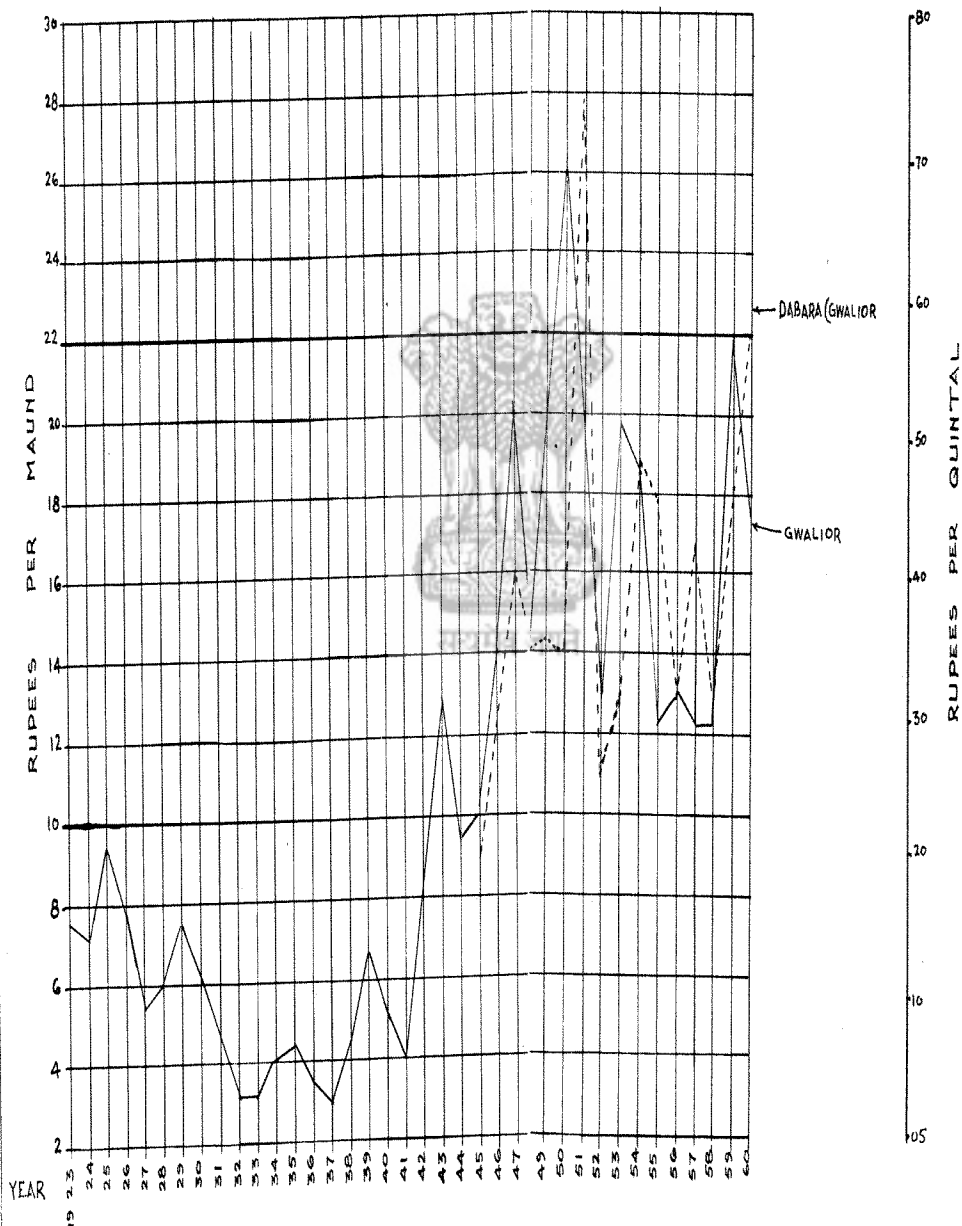
(e) **1943-57.**—Towards the end of 1943, wheat was decontrolled. The reaction was a sudden rise in the prices in all the important markets, e.g., at Jabalpur, where the rise was cent per cent in 4 months which stimulated arrivals in the market. In April, 1943, Central Provinces and Berar Food-grain Control and Export Restriction Act came in force prohibiting inter-district movement of wheat. Government started making purchases for supplies to the consuming centres, where the prices soared high. Wheat was also imported from Punjab and Uttar Pradesh to steady up the prices. During the marketing season of 1944, Government fixed ceiling prices for wheat between Rs. 10.00 to Rs. 11-8-0 per maund (Rs. 26.79 to 29.60 per Q1) and the system of monopoly procurement was introduced. Due to failure of crop in that year this policy could not achieve the same results as rice. The orders suspending monopoly procurement of wheat were issued on the 4th December 1944. The effect was a sudden fall in prices of wheat in surplus areas as no purchasers came forth due to ban on inter-district movement. The lifting of this ban later had an encouraging effect all over. Prices were fair till about February, 1945 and then steadily rose till the partition of India in August, 1947. Due to disturbed conditions of agriculture, displacement of population, the wheat prices rose rocket high to Rs. 26-4-0 per maund (Rs. 70.32 per Q1) in 1947-48. The high price level, however, could not sustain and due to efforts of Government of India to import huge quantities in the country, the prices declined, although these were quite high upto the year 1953-54 when the prices stood at Rs. 18.32 per maund (Rs. 40.00 per Q1).

(f) Due to good harvest in the years 1954-55 and 1955-56 and also due to completion of minor irrigation works the wheat production shot up and consequently the prices

MONTHLY AVERAGE PRICES OF GUR

AT

GWALIOR & DABARA



fell to about Rs. 11.50 per md. (Rs. 29.60 per Q1) at Sagar. The prices again started rising from 1956 and in 1958-59 they touched the high figure of Rs. 20.00 per md. (Rs. 53.58 per Q1).

8.6 Prices of Gur.—We have obtained the prices of Gur in the two principal markets of the State of Gwalior and Dabra. (Appendix IV-12.) For Gwalior market, the prices are available for the period 1928 to 1960 and that for Dabra for the period 1945 to 1960. The prices of Gur during the period 1923 to 1929 varied between Rs. 9.58 per maund (Rs. 25.66 per Q1) in 1925 to 5.45 per md. (Rs. 14.60 per Q1) in 1927, but fluctuated about the average figure of Rs. 7.50 per md. (Rs. 20.09 per Q1). From the year 1930 the prices started declining. This was the effect of general world-wide depression. In the year 1930 it was Rs. 6.20 per maund (Rs. 16.61 per Q1). The lowest price was in 1937, i.e., Rs. 2.97 per md. (Rs. 7.95 per Q1). From this year prices of Gur started rising and reached as high as Rs. 20.42 per md. (Rs. 54.71 per Q1) in the year 1947. In 1948 prices fell to Rs. 13.56 per md. (Rs. 36.33 per Q1) and reached the highest figure of Rs. 26.13 per md. (Rs. 70.00 per Q1), in 1950. In the period 1951 to 1960 the prices fluctuated between Rs. 12.52 per md. (Rs. 33.54 per Q1), the lowest in the year 1952, and Rs. 22.27 per md. (Rs. 56.66 per Q1) in 1959. In 1960 the price figure was Rs. 17.06 per maund (Rs. 45.70 per Q1). Price of Gur at Dabra was Rs. 8.50 per md. (Rs. 22.40 per Q1) in the year 1944-45. Price rose to Rs. 16.00 per md. (Rs. 42.86 per Q1) in 1946-47 and remained steady at Rs. 19.40 per md. (Rs. 37.51 per Q1) for the next three years. The price of Gur soared to the highest, viz. Rs. 28.00 per md. (Rs. 75.01 per Q1) in the year 1950-51 and fell to Rs. 11.00 per maund (Rs. 29.47 per Q1) in 1951-52. During the period 1953-60 the prices varied between Rs. 19.00 per md. (Rs. 50.90 per Q1) in 1953-54 to Rs. 22.37 per md. (Rs. 59.94 per Q1) in the year 1959-60. The price curve of Gur depicts the remarkable feature that fluctuations in prices are rapid which is distressing to the sugarcane cultivators, who have to invest high sums for growing this crop.

8.7 Prices of kapas obtained by the Agriculturists all over India are dependent on prices of cotton prevailing at Bombay. A graph of yearly average prices of Indian cotton prevailing at cotton exchange from 1906-07 upto 1958-59 has been prepared and is given in Chart. The price trend during the above period can be divided in the following manners. Price of cotton

(a) **1906-07 to 1915-16.**—During this period the prices of Broach Cotton varied between Rs. 240.00 per candy (356 K. GM.) to Rs. 347.00 per candy except during the year 1914-15, during which the prices went down very low, viz. Rs. 202.00 per candy. During this year prices of other type of cotton were also low.

(b) **1916-17 to 1919-20.**—Due to First World War the prices of cotton shot up abruptly and touched the highest level of Rs. 614.00 per candy resulting in an increase of nearly 200 per cent in the year 1917-18.

(c) **1920-21 to 1929-30.**—After the First World War prices of Indian cotton began to decline gradually and during 1929-30 price level of cotton was practically the same as existed in the year 1911-12.

(d) **1930-31 to 1938-39.**—This period was generally slump period and as such prices of cotton like all other commodities continued to decline successively and reached the lowest level of Rs. 157.00 per candy during the year 1938-39.

(e) **1939-40 to 1951-52.**—From the year 1938-39, the prices of cotton began to increase successively from year to year and reached highest level of Rs. 820.00 per candy, i.e., the ceiling price fixed by the Government of India. To stop the soaring of prices, the Government had to stop speculation and hedge-trading in cotton was altogether banned.

(f) **1952-53 to 1958-59.**—Due to slump during the year 1952-53 the prices of cotton was also substantially reduced and continued to decline up to 1954-55 and thereafter there has been under fluctuation in the average price.

Conclusion.

8.8 The graphs of prices of the three principal commodities, conclusively depict that the prices remained low during the period 1931-41 and remained high during 1947 onwards. In the period 1942-46, the prices fluctuated tremendously due to War. The present measures of Government regarding fixation of ceiling prices of commodities and restrictions on their movements have a good effect on stabilising the income of the farmers and we consider that the price support policy as followed by the Government at present should continue in the interest of irrigation works and cultivators alike.

CHAPTER IX.—HISTORICAL REVIEW OF WATER RATES IN MADHYA PRADESH AND COMPARISON WITH OTHER STATES.

9.1 In this Chapter we shall make a detailed study of the prevalent water rates in the neighbouring States, in order to determine their variation in relation to rainfall and soils and compare the same with conditions prevailing in Madhya Pradesh. Political boundaries should in no way work inequitably on the populace, since unification of irrigation practices is now being followed in the various states, under the advice of Planning Commission. Introduction.

9.2 Most of the works in the State are flow works concentrated mainly in Mahakoshal and Madhya Bharat regions. A review of the water rates charged on these works is made since the commencement of State irrigation. For works in Vindhya Pradesh and Bhopal regions, records of rates prior to 1954 are not available, presumably because the area served from the State irrigation works was small.

9.3 In Mahakoshal region, irrigation from State works was started in the year 1907. At that time, only small works irrigating about 3,000 acres (1215 ha.) existed. For irrigation of rice crop there were two systems, *viz.*, one year agreement rate and secondly the demand rate. Water for irrigation of rabi and sugarcane crops was issued on demand at prescribed rates. In order to trace the changes on water rates, we would consider the case of rice crop irrigation alone. In the year 1907-08, a rate of Rs. 0.50 per acre (Rs. 1.23 per ha.) was charged. In 1908-09, the rate was raised to Rs. 0.75 per acre (Rs. 1.85 per ha.). This rise in rates continued till the year 1912-13, and the charges were as per table below :—

Year	TABLE	
	Rates in Acre	Rupees per Hectare
1909-10	1.25	3.10
1910-11	1.75	4.32
1911-12	2.00	4.94

In 1912-13, in order to stabilise the Irrigation revenue, the system of long-term agreement (for 5 years) was tried for the first time and the rate fixed was Rs. 2.50 per acre (Rs. 6.17 per ha.). The long term agreement system was not popular due to general backwardness of the tract and had to be abandoned. Again recourse was taken to one year agreement system. The rate charged between 1913-14 to 1917-18 was Rs. 2.50 per acre (Rs. 6.17 per ha.).

9.4 At this time, the large size irrigation works, *viz.*, Tandula and Mahanadi Canals, were nearing completion and the Government had to fix rates for these large works

separately. From the year 1918-19, the Government again tried and ultimately succeeded in introducing long term (10 years) agreement system with a sliding scale of water rates. These rates had sufficient inducement for the cultivators, to take to wet farming.

9.5 On the Tandula Canal System the rates rose steadily from no charge in the first year, *viz.*, 1918-19 to Rs. 1.50 per acre (Rs. 3.70 per ha.) in the second year, and rising by Rs. 0.25 per acre (Rs. 0.62 per ha.) every year to Rs. 3.50 per acre (Rs. 8.64 per ha.) in the year 1927-28. The agreements were renewed at the rate of Rs. 3.00 per acre (Rs. 7.41 per ha.) for eight years in 1928-29, which was a concession over the previous rate of Rs. 3.50 per acre (Rs. 8.64 per ha.).

9.6 The rates for fresh agreements done between 1928 and 1930 were again made telescopic to attract new villages for irrigation.

The sliding scale introduced was as under :—

Year	Rate in Rs. per	
	Acre	Hectare
1st year	Free	Free.
2nd year	1.50	3.70
3rd year	1.50	3.70
4th year	2.00	4.94
5th year	2.50	6.17
6th year	3.00	7.41
7th year to 10th year	3.50	8.64

9.7 The rates for renewal of lapsed agreements between 1936-37 to 1942-43 were fixed at Rs. 3.50 per acre (Rs. 8.64 per ha.) per year. For fresh agreements a somewhat moderate sliding scale, as shown below was sanctioned :—

Year	Rate in Rs. per	
	Acre	Hectare
1st year	Free	Free
2nd year	1.75	4.32
3rd year and onwards	3.50	8.64

(vide P.W.D.
Notification
No. 1438 of
26-11-34).

Due to favourable monsoon and a steep fall in the prices of rice, the cultivators started showing great apathy towards entering into long term agreement. Most of them did not renew them in the year 1937. At this stage, the

Government reduced the agreement rates and the renewal of agreements in the kharif season of 1937 was done at Rs. 2.25 per acre (Rs. 5.56 per ha.). The same rate was fixed for new agreements also. From those who signed the agreement in 1937-38 a comparatively higher rate of Rs. 2.75 per arce (Rs. 6.78 per ha.) was charged. Simultaneously, the Government introduced a new form (A-1 Form) of agreement, by which the cultivators had the option to expand their area under rice without extra payment, which became very popular.

9.8 With a view to improve irrigation revenue the Government reviewed the water rates in the following manner :—

Those who accepted the 10-year agreement in 1939 were charged at Rs. 1.81 per acre (Rs. 4.56 per ha.), while those entering in 1940 had to pay slightly higher rate, *viz.*, Rs. 2.00 per acre (Rs. 4.94 per ha.). The rates for agreements renewed in 1941 was Rs. 2.25 per acre (Rs. 5.56 per ha.). During the year 1943, all the renewals and new agreements were done at the rate of Rs. 2.25 per acre (Rs. 5.56 per ha.). This rate continued to be charged till the year 1953. To improve the financial results of irrigation, the rates were increased by 50 per cent and the rate for 10—year agreements under Form A-I was fixed at Rs. 3.37 per acre (Rs. 8.82 per ha.).

9.9 Under Government memo No. 3082/C/G-57 of 11-11-57 the period of agreement was reduced to 5 years term looking to the fluctuating condition of agricultural produce. The rate has, however, remained unchanged.

9.10 The foregoing study of rates on a typical large canal system of Mahakoshal, gives the past trends of water rates from which the only conclusion drawn is that the water rates varied from time to time so as to suit the cultivators' capacity to pay and were in harmony with the market value of the produce.

9.11 Generally water rates on other canal systems in old Madhya Pradesh, *viz.*, Mahanadi, Maniari, Kharang and Wainganga canals have been changing more or less in the same manner. Due to completion of Kharung and Maniari canals at the time of World-wide economic depression of early thirties, the irrigation under these works was not in demand and nominal water rates were fixed. The rates under the Wainganga Canal have always been higher. in comparison with those of other similar works of Chhattisgarh, due to the higher produce of rice on account of use of transplantation methods.

9.12 A note on present system of water rates levied in various regions is given below. This is followed by the Schedules of rates in force in the State:—

- (a) In Mahakoshal region the rates are levied districtwise and are different for areas irrigated under agreement and on demand and the

latter rates are much higher. For works located in un-developed area, lower rates are sanctioned. Rates are crop rates and are quite low for staple food crops and are different for old and new (plan) works. The works mostly irrigate single crop. To give incentive for wheat cultivation lower rates have been fixed and for perennial crops rates are comparatively high.

- (b) In the Madhya Bharat region irrigation works are classified in 'A', 'B', 'C' and 'D' categories. The water rates for 'D' class of works are fixed with settlement and these tanks are called "Tashkish" tanks; 'C' class works are submerging tanks and 'Abi' water rates are charged for these. 'A' and 'B' class of works have regular canals, the sub-division in two classes is according to the degree of reliability and efficiency of distribution of supplies. Uniform water rates were fixed by the 'Lakshmi Chand Jain' Committee in the year 1951-53, for 'A' 'B' and 'C' class works.
- (c) In the Vindhya Pradesh region rates have been fixed separately for old works and new works. These rates were revised in 1953.
- (d) In the Bhopal region uniform rates were fixed for flow and lift irrigation, respectively. Where lift is done at Government expenses the rates are twice the flow rates, while for lift done by the cultivators, rates are half the flow rates. Special high rates for irrigation by sewage flow are charged.

Review of water rates.

9.13 Water rates in the old Madhya Pradesh were frequently reviewed till the year 1943. Since then, the revision in rates for old works has been done only once, i.e., in 1953, although rates for new (Plan) works were also fixed in the year 1957. Change of the tenure of agreement were also ordered in 1957.

In Madhya Bharat, the rates prevalent in the small merging States were unified and the rates were then subsequently revised in the year 1953. Sliding scale of water rates was fixed, the highest rate was attained in 1958-59.

In Vindhya Pradesh and Bhopal, the old system of charging 'Abi' rates was ordered to be discontinued in the year 1954 (Vindhya Pradesh) and year 1953 (Bhopal). Water rates as fixed in the new schedule became leviable thereafter.

The increments in water rates for the principal food crops, *viz.*, rice in Mahakoshal and wheat in Madhya Bharat are given in the table below :—

Year	Region			
	Mahakoshal (Rice irrigation)	Madhya Bharat (Wheat irri- gation)	Mahakoshal (Rice irrigation)	Madhya Bharat (Wheat irri- gation)
	Rs. per acre		Rs. per hectare	
1912	2.50	3.00	6.17	7.41
1924	2.75	N.A.	6.79	N.A.
1934	3.25	N.A.	8.03	N.A.
1945	2.50	5.00	6.17	12.35
1954	3.75	6.50	9.26	16.05
1957 and onwards * ..	3.75	7.50	9.26	18.52

It is clear that the rise in rates in Mahakoshal region has been by a meagre amount of Rs. 1.25 during an interval of 45 years while in the same period increase in rates in Madhya Bharat was Rs. 4.50, *viz.*, 3.6 times.

9.14 Current Water Rates in Mahakoshal region of Madhya Pradesh—

System of assessment—Crop acreage. Date of enforcement—1-4-1953.

ALL PROJECTS IN THE STATE

1.—Rice under agreement

				Rs. per	
				Acre	Hectare
(a) <i>Kharif</i> —					
1. Sagar	..	Chandianalla Tank		2.00	4.94
2. Sagar	..	All tanks (Except Chandia)		2.69	6.64
3. Jabalpur	..	Bhartala and Jagwa Tanks ..		2.00	4.94
4. Jabalpur	..	All tanks (Except Bharatla & Jagwa).		2.69	6.64
5. Bilaspur	..	All tanks and Canals ..		2.44	6.02
6. Raipur	..	All tanks and Mahanadi Canal		3.75	9.26
7. Durg ..	..	All tanks and Tandula Canal		3.37	8.32
8. Chhindwara		Bori tank		3.37	8.32
9. Chhindwara		All tanks (Except Bori) ..		4.00	9.88
10. Balaghat		All tanks in Baihar Tahsil ..		2.00	4.94
11. Balaghat		All tanks (except those in the Baihar Tahsil and Wain-ganga Canal.		4.00	9.88

*At the time of reorganisation of States

			Rs. per	
			Acre	Hectare
(ii) Rice on demand				
1.	Balaghat ..	All tank (Except those in Baihar Tahsil and Wain-ganga Canal.	12.00	29.64
2.	Balaghat ..	All tanks in the Baihar Tahsil	6.00	14.82
3.	Chhindwara ..	All Tanks (Except Bori) ..	12.00	29.64
4.	Chhindwara ..	Bori Tank	7.50	18.52
5.	Jabalpur ..	Dharwara, Silpuri, Parachital, Gharbanda, Purba and Pali tanks and the left bank channel from Amothia tank.	6.75	16.67
6.	Jabalpur ..	Hardwara and Bhartala tanks	6.75	16.67
7.	Jabalpur ..	All tanks other than those mentioned against items 6 and 7.	9.00	22.24
8.	Sagar ..	(Except Damoh All tanks except & Hatta Tahsils) Chandiana nala.	3.00	7.41
9.	Sagar ..	Chandiana nala tank (except Damoh & Hatta Tahsils).	9.00	22.24
10.	Sagar (Damoh and Hatta Tahsil only).	All tanks	9.00	22.2
11.	Raipur, Durg and Bilaspur.	All tanks and canals	9.00	22.2
(iii) Cotton				
1.	All districts ..	All canals and tanks	1.00	2.47
(iv) Sweet potatoes, groundnuts and termaric on demand (from the 1st July to 31st December)				
1.	All districts ..	All tanks and canals (in addition to crop rates).	0.50	1.23
(v) For ploughing following by wheat irrigation (from the 1st July to 31st December)				
1.	All districts ..	All tanks and canals (in addition to crop rates).	0.50	1.23
(vi) Preparing land for cultivation for ploughing only (on demand) (from 1st July to 31st December)				
1.	All districts ..	All canals and tanks	1.00	2.47
(vii) Water supply for filling private tanks and for cultivating water nuts (on demand) (from 15th July to 31st October)				
1.	All districts ..	All Canals and Tanks	1.50	3.70

			Rs. per	
			Acre	Hectare
(b) <i>Rabi</i> —				
1. Sagar	..	Chandia Nala and Narainpur tanks.	4.00	9.88
2. Sagar	..	Dhargour tank.	3.00	7.41
3. Jabalpur	..	Muchiawan Hansraj, Choti Deori Nala and Jamnera tanks).	2.69	6.64
4. Jabalpur	..	Hardwara, Sukarwara and Musanda tanks.	2.69	6.64
(ii) Wheat on demand				
1. Balaghat	..	Tanks in the Baihar Tahsil ..	1.50	3.70
2. Balaghat	..	All tanks (Except those in Baihar Tahsil) and the Wainganga Canal.	2.25	5.56
3. Jabalpur	..	All tanks	3.75	9.26
4. Chhindwara		All tanks	2.25	5.56
5. Sagar	..	Chandia nala and Narainpura tanks.	12.00	29.64
6. Sagar	..	All tanks (except Chandia-nala and Narainpura).	3.75	9.26
7. Raipur, Durg and Bilaspur.		All tanks and canals	1.50	3.70
(iii) Groundnuts, Cotton, Winter, rice (on demand).				
All canals and tanks			4.00	9.88
(iv) Castor Oil Plant, barley, oats, mustard, batra, soya-beans (on demand)				
1. All districts	..	All tanks and canals	2.00	4.94
(v) Korlandar and the minor rabi crops masur, kusum Gram, arhar, mughai, tilli and linseed (on demand)				
1. All districts	..	All canals and tanks	1.00	2.47
(vi) For ploughing followed by wheat irrigation (on demand) from (from 1st January to 30th June)				
1. All districts	..	All tanks and canals	1.00	2.47
			(in addition to crop rates).	
(vii) Preparing land for cultivation for ploughing only (on demand) (from 1st January to 30th June)				
1. All districts	..	All canals and tanks	2.00	4.94
(viii) Water supply for filling private tanks and for cultivating waternuts (from 1st November to 15th July)				
1. All districts	..	All tanks and canals	3.00 for 10,000 Cft. or 283 Cu. M of water.	

	Rs. per	
	Acre	Hectare

(c) *Perennial*—

1. All districts .. All tanks and canals	25.00	61.75
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(ii) **Garden crops such as chillies brinjals potatoes, onions, carrots, tomatoes, cabbages, cauli-flower knodolhi, radish, cucumber, water melon, gourds, lady's finger, arum, garlic, jeera, methi, lettuce, coriander and other green vegetables (on demand)**

1. All districts .. All canals and tanks	10.00	24.70
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(ii) **Sannhemp, clover, berseem and lucern and other fodder crops (on demand)**

1. All districts .. All canals and tanks	10.00	24.70
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(iv) **Pan, plantain and mulberry plants (on demand)**

1. All districts .. All canals and tanks	15.00	37.05
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(v) **Fruits, orchards (on demand)**

1. All districts .. All canals and tanks	15.00	37.05
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Rates for plan works in Matkoshal region have been fixed as follows :—

Rice under agreement for 5 years	6.00 to 8.00	14.82 to 19.76
Rice on demand	12.00	29.64
Wheat on demand	6.00	14.82
Cotton on demand	5.00	12.35
Sugarcane on demand	25.00	61.75

9.15 Current water rates in Madhya Bharat Region.—
Date of Enforcement 1954

Name of crop	Year				
	1954-55	1955-56	1956-57	1957-58	1958-59
	Increase 30%	Increase 35%	Increase 40%	Increase 45%	Increase 50%
(1)	(2)	(3)	(4)	(5)	(6)
	Acre	Acre	Acre	Acre	Acre
	Hectare	Hectare	Hectare	Hectare	Hectare
	Rs.	Rs.	Rs.	Rs.	Rs.
Sugarcane	18.75 46.31	18.75 46.31	18.75 46.31	18.75 46.31	18.75 46.31
Rice	8.12 19.90	8.44 20.85	8.75 21.61	9.06 22.38	9.37 23.16
Orchard	18.75 46.31	18.75 46.31	18.75 46.31	18.75 46.31	18.75 46.31
Vegetable	8.12 19.90	8.44 20.85	8.75 21.61	9.06 22.38	9.37 23.16

(1)	(2)	(3)	(4)	(5)	(6)
	Acre	Acre	Acre	Acre	Acre
	Hectare	Hectare	Hectare	Hectare	Hectare
	Rs.	Rs.	Rs.	Rs.	Rs.
Wheat	6.50 16.05	6.75 16.67	7.00 17.29	7.25 17.91	7.50 18.52
Opium	8.12 19.90	8.44 20.85	8.75 21.61	9.06 22.38	9.37 23.16
Tobacco	8.12 19.90	8.44 20.85	8.75 21.61	9.06 22.38	9.37 23.16
Cotton	6.50 16.05	6.75 16.67	7.00 17.29	7.25 17.91	7.50 18.52
Gram	4.06 10.02	4.22 10.42	4.37 10.80	4.50 11.11	4.69 11.58
Other Rabi ..	6.50	6.75	7.00	7.25	7.50
Crops,	16.05	16.67	17.29	17.91	18.52
Other Kharif ..	4.00 10.02	4.22 10.42	4.37 10.80	4.53 11.11	4.69 11.58
ABI	6.50 16.05	6.75 16.67	7.00 17.29	7.25 17.91	7.50 18.52

**9.16 Current water rates in Vindhya Pradesh Region —
Date of enforcement—1-1-54.**

Name of crop	Water Rates			
	Old works		New works	
	Acre	Hectare	Acre	Hectare
	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.
Rabi (wheat Barley or crop mixed with wheat or Barley).	4.00	9.88	6.00	14.82
Methi vegetable garden ..	4.00	9.88	6.00	14.82
Other rabi chana, Massur, Matur, etc.	2.25	5.56	3.00	7.41
Pulse	3.00	7.41	4.00	9.88
Sugarcane	5.00	12.35	10.00	24.70
Emerged area	3.00	7.41	6.00	14.82
Paddy	4.00	9.88	6.00	14.82
Urd and Mung	3.00	7.41	4.00	9.88
Tobacco	4.00	9.88	6.00	14.82
Vegetable garden and poppey other kharif crops.	3.00	7.41	4.00	9.88

NOTE.—The rates are for flow irrigation.
The rates will be half for lift irrigation.

9.17A—Current water rates in Bhopal Region—Date of enforcement 9-5-53.

S. No.	Name of crop	Water Rates		Remarks
		Acre	Hectare	
(1)	(2)	(3)	(4)	(5)
		Rs. nP.	Rs. nP.	
1	Paddy	7.00	17.29	
2	Wheat Gram	10.00	24.70	
3	Sugarcane	30.00	74.10	(a) Round the city of Bhopal and Shore.
4	Orchards (a)	20.00	49.40	
5	Vegetables	30.00	74.10	
6	Orchards (b)	15.00	37.05	(b) Elsewhere in the state.
7	Vegetables	20.00	49.40	

B.—Water rates per acre of various crops to raise them to maturity from lift irrigation (a) lifting water at Government expense.

1	Paddy	14.00	34.58	
2	Wheat	20.00	49.40	
3	Sugarcane	60.00	148.20	
4	Orchards (a)	40.00	98.80	(a) and (b) same as above.
5	Vegetable	60.00	148.20	
6	Orchards	30.00	74.10	
7	Vegetables (b)	40.00	98.80	

C.—Water rates per acre of various crops to raise them to maturity from (b) Lifting water by cultivators themselves from Government owned and maintained tanks.

Serial No.	Name of crops	Rates per hectare (acre)	
		Acre	Hectare
(1)	(2)	(3)	(4)
		Rs. nP.	Rs. nP.
1	Paddy	3.80	8.64
2	Wheat Gram	5.00	12.35
3	Sugarcane	15.0	37.00
4	Orchards (a)	10.00	24.70
5	Vegetables	15.00	34.58

(1)	(2)	(3)	(4)
		Rs.	nP.
6	Orchards	7.80	18.52
7	Vegetables (b)	10.00	24.70

D—Water rates per acre of various crops to raise them to maturity from sewage and sullage water.—

1	Paddy	14.00	34.58
2	Wheat Gram	30.00	74.10
3	Sugarcane	90.00	222.30
4	Orchards	40.00	98.80
5	Vegetables	110.00	148.20

In case of green manuring Rs. 2.00 per acre (Rs. 4.94 per ha.).

9.18 Comparative statement of water rates in various Regions of Madhya Pradesh and rates charged on works in the neighbouring states (for details see appendix III-16), are below :—

Type of Irrigation	Name of Crop	Madhya Pradesh			
		Mahakoshal	Madhya Bharat	Vindhya Pradesh	Bhopal
(1)	(2)	(3)	(4)	(5)	(6)
(a) Flow Irrigation	Kharif (Paddy) ..	old works 2.00 4.00 New works 6.00- 8.00.	9.37	Rs. 4/- to Rs. 6/- for old works and new works, respectively.	Rs. 7/-.
	Rabi (Wheat) ..	2.69 to 4.00	7.50	4.00 to 6.00 for old and new, respectively.	10.00
	Perennial (Sugar- cane).	25.00	18.75	Rs. 5.00 to Rs. 10.00 for old & new works, respectively.	30.00
(b) Lift Irrigation	Kharif (Pady) ..	..	..	..	14.00
	Rabi (Wheat) ..	Rs. 1.00 per 10000 gallons for new works.	..	..	20.00
	Perennial (Sugar- cane).	..	..	..	60.00

N.B. (a) *Mahakoshal*.—The minimum rates of Rs. 2.00 is of Chandia Nalla tank of Sagar and the maximum rate of Rs. 4.00 of all tanks in Chhindwara except Bori. Rate for Rabi 2.69 of Hardwara, Sukarwara, Musanala tanks of Jabalpur and Muchiawan Hansraj, Chotti Deori Nalla and Jamnera tanks of Sagar and Rs. 4.00 maximum of Chandia nalla and Narainpura tanks of Sagar. Perennial (sugarcane) Rate of Rs. 25.00 is considered for all Districts in Mahakoshal.

(b) *Madhya Bharat*.—All tanks have been considered for Kharif, Rabi and Perennial (Sugarcane).

(c) *Vindhya Pradesh*.—The reduced rates of Paddy, Rabi (wheat) and sugar cane are for the old works and the increased rates are for the new works.

(d) *Bhopal*.—All tanks have been considered for Paddy, Rabi (wheat) and perennial (sugarcane) and for lift Irrigation double the rates of flow irrigation have been charged for all the mentioned above.

9-19. Comparative statement of water rates in other States—

Type of Irrigation	Name of crop	Name of States					
		Bombay	Bihar	Uttar Pradesh	Orissa	Andhra	Rajasthan
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Flow Irrigation.	Kharif (Paddy)	Rs. 2/- to Rs. 6/-.	Rs. 8/- to Rs. 10/-	Rs. 10/- to 14/-	Rs. 2.50 to 3.00	Rs. 3/- to 15.00.	Rs. 7.00 to Rs. 9.00.
	Rabi (Wheat).	Rs. 1.50 to Rs. 10.	Rs. 4/- to Rs. 5/-.	Rs. 10/- to 12/-.	Rs. 2/- to Rs. 6/-.	..	Rs. 2/- to Rs. 6/-
	Perennial (sugarcane)	Rs. 80/- to Rs. 120/-.	..	Rs. 16/- to 32/-.	Rs. 6/- to Rs. 16/-.	..	Rs. 16.25 to Rs. 22.00.
B. Lift Irrigation.	Kharif (Paddy).	..	Rs. 6/- to Rs. 8/-.	Rs. 1/- per 11,000 gallons to (Diesel) 16,000 gallons (electric).	..	..	..
	Rabi (Wheat)	..	Rs. 4/- to Rs. 5/-.	..	..	..	..
	Perennial (sugarcane)	..	Rs. 16.00 to 18.00.	..	..	..	..

for details of water rates on Irrigation works—See App. III-16.

N.B.—(a) *Bombay*.—Rates on all works of Maharashtra, Vidharba and Marathawad have been considered.

(b) *Bihar*.—Rates charged in (i) Son Canals, (ii) Champaran Saran canals. For the tube wells rates on north Bihar and South Bihar have been considered.

(c) *Uttar Pradesh*.—Rates charged on Upper Ganges and East river Jamuna canal. Betwa Canal and Ken Canal have been taken.

(d) *Orisa*.—Rates charged on North canals with high and low level edge and Hirakud Projects considered.

(e) *Andhra*.—Rates charged on all works in the State considered.

(f) *Rajasthan*.—Rates for Jaipur canals, Gokak Canals, Bhakra Project and Ghaggar Canal considered.

CHAPTER X—BRIEF REVIEW OF REPLIES TO THE QUESTIONNAIRE AND EVIDENCE

10.1 As mentioned in para 1.3 we had prepared a Circulation of questionnaire containing 54 questions and circulated it to questionnaire. the following :—

- (1) All Members of Parliament and Legislative Assembly of Madhya Pradesh;
- (2) District and Tahsil Level Advisory Committees in Bhopal region;
- (3) District Advisory Committees in Vindhya Pradesh region ;
- (4) Janpad Sabhas and Irrigation Panchayats of Mahakoshal region;
- (5) Kendra Panchayats of Madhya Bharat region;
- (6) Agricultural Societies;
- (7) Gram Panchayats in irrigated areas;
- (8) Principals and selected professors of Agriculture Colleges of the State ;
- (9) Managers of Farms;
- (10) The Farmer's Forum of Madhya Pradesh;
- (11) Engineering Societies;
- (12) Leading Farmers; सत्यमेव जयते
- (13) Commissioners of all Civil Divisions;
- (14) Collectors of all districts;
- (15) Officers of the Irrigation Branch of Public Works Department, viz., all Superintending Engineers, selected Executive Engineers and Canal Deputy Collectors; and
- (16) Leading Economists.

10.2 The questionnaire was very comprehensive and besides other items it elicited opinion regarding the cost of cultivation, Produce of crops, Water rates and Management of Irrigation works. The witnesses required ample time and labour to furnish the replies. The committee kept this point in view and extended the last date for receipt of replies several times, the last date being July 31, 1960. Also during our tours, we made it a point to discuss with the irrigators the minutest details of views which they had expressed in written replies. Similarly experienced officers of Government Departments who were

Response to the questionnaire and co-operation for collecting evidence

concerned with the Irrigation problems and food production *viz.* Revenue Department, Agriculture Department, Land Records and Irrigation Departments were called for evidence. 272 written replies to the questionnaire were received from all sources. Oral evidence from 140 individuals and 156 persons in groups (total 296) was recorded during our tours. The replies received and evidence collected represent various shades of opinion. We may make it clear at the outset, that our appraisal of the replies at best, reflects general trend of opinions held by the witnesses. In most of the cases the witnesses who came forward gave right and pointed replies to the questions with frankness which enabled the Committee to understand the real situation. In some extreme cases a few witnesses tried to marshall the facts in such a way so as to lead the Committee to think in terms of fixing lower rates for their areas. It required great effort on the part of the members of the Committee to elicit relevant and correct information. It was generally noticed that while giving replies to our questions the people were dominated more or less by local problems and difficulties regarding irrigation methods and practices. This was but natural.

10.3 It became evident to us that due to varying climatic and agronomic conditions in the State, the methods of cultivation of the same crop differ widely resulting in varying yields. Similarly, the reported figures of expenditure also varied and we noticed that the water rates had no co-relation with them. As most of the existing irrigation works had been operated under the laws of various administrative units of the State in the past, the water rates charged under these works had no co-relation and we had to weigh and consider all different influencing factors while arriving at the proposed schedule of water rates as given in Chapter XI.

We now analyse the whole evidence, oral as well as documentary, with particular reference to the terms of the enquiry.

10.4 According to the evidence yield is governed by rainfall and application of manure and irrigation. The study of evidence with reference to different regions disclosed further variation. We have classified the information in the following table with reference to regions and crops which gives a correct idea of the yield of crops with and without manure, as well as with normal rainfall and with application of irrigation.

Produce of principal
crops irrigated and
manured fields.

Table

The following figures of the produce of principal crops have been obtained :—

Yield of crops

Serial No.	Name of crop and source of information	Unirrigated and unmanured md/acre	Unmanured and irrigated md/acre	Manured and unirrigated md/acre	Irrigated and manured md/acre
(1)	(2)	(3)	(4)	(5)	(6)
1	Rice—				
	(a) Cultivators	5.40	9.42	8.71	14.39
	(b) All Sources*	6.47	10.98	10.43	15.72
2	Wheat—				
	<i>A. Indore.</i>				
	(a) Cultivators	4.90	8.70	6.00	14.10
	(b) All Sources	5.00	9.30	7.50	14.30
	<i>B. Satna—</i>				
	(a) Cultivators	4.30	8.00	N.A.	9.50
	(b) All Sources	5.40	10.00	8.20	12.20
	<i>C. Gwalior—</i>				
	(a) Cultivators	5.50	10.00	9.00	15.60
	(b) All Sources	5.50	12.70	9.50	16.40
	<i>D. Bhopal—</i>				
	(a) Cultivators	3.00	7.00	5.00	10.00
	(b) All Sources	5.50	10.40	8.40	12.40
	<i>E. Jabalpur—</i>				
	(a) Cultivators	5.70	8.80	7.00	13.70
	(b) All Sources	4.00	9.50	7.70	15.30
	<i>F. Raipur—</i>				
	(a) Cultivators	4.50	6.75	6.00	8.50
	(b) All Sources	4.80	7.20	6.20	9.20
2	Sugarcane (Gur).—				
	(a) Cultivators	5.50	15.00	15.00	54.00
	(b) All Sources	17.62	36.76	27.50	54.34

*NOTE—This includes reports from the Land Records Revenue, Agriculture and Public Works (Irrigation Branch) Department.

10.5 In areas where rainfall is normally heavy it is rather difficult to determine the net advantage due to irrigation. Some witnesses in districts of Durg and Raipur stated that in their area rainfall being heavy they derive little additional benefit from irrigation. In the Malwa region, some of the witnesses expressed that irrigation of wheat crop was of little advantage, as under normal rainfall wheat crop thrived well and there was always a fear of rust if additional water was given. But even in these areas the general trend, as revealed from the mass of evidence, was that irrigation every where gave extra yield and it was a necessity. In fact, our impression is that irrigation facilities are in great demand. The witnesses every where admitted, that extra yield by irrigation was assured subject to factors e.g., preparation of fields, weeding, germination of seeds, manuring etc. Study of the table given above will convince, that irrigation admittedly gives extra yield even in Malwa region, where a fear of rust exists in case irrigation water is given.

Expenditure in raising crops.

10.6 The Committee while examining witnesses took keen interest to study the item of cost of cultivation. This aspect is very important, as the expenditure in raising crop influences the extra benefit in the yield. As a result of our study of the various items of cost, we have arrived at certain figures of expenditure relating to main crops as described in the following table. Further details of this expenditure have been provided in Appendix III-17 (a), 17 (b) and 17 (c).

Name of crop		Total expenditure of cultivation (Rs. per acre)	Land Revenue (Rs. per acre)	Water rate (Rs. per acre)	Total (Rs. per acre)	Remarks
(1)		(2)	(3)	(4)	(5)	(6)
Paddy	..	105.50	2.50	8.00	116.00	The cost of cultivation is the average as under common practice.
Wheat	..	128.50	2.56	10.00	141.06	
Sugarcane	..	422.50	2.50	48.00	473.00	

Basis for fixing Irrigation water rates.

10.7 The question of fixing irrigation water rates is an important one. What should be the guiding principle, whether it should be the quantity of water supplied, the value of crop grown, extent of benefit realised by the cultivator or ability of the cultivator to pay. Which of these factors should be taken as the criterion for fixation of water rates?

The consensus of opinion of the irrigators appears to be inclined towards the fact, that the ability to pay should be the main consideration. They based their point of view on this reasoning that while the prices of food grains have gone up considerably, the cost of production and prices of necessities of life have also increased simultaneously. Thus their ability to pay higher rates has not increased very much. Shri C. H. Sanghvi, Deputy Chief Engineer, Irrigation Branch and Shri S. P. Caprihan, Superintending

Engineer, Rewa Irrigation Circle were of the opinion that the water rates should be fixed for redemption of the capital cost and over-head charges including operation and maintenance charges, as unless this were done, further development programme of the State could not go ahead. Shri D. S. Sinha, Superintending Engineer, Minor Irrigation on the other hand, considered that the ability of the cultivators to pay should be the primary consideration for fixing water rates as the advantage of irrigation could not be taken by the cultivators and whole efforts of Government to produce more food would not bear fruit.

10.8 In our State sugarcane appears to be the only important cash crop. The managers of Bhopal Sugar Factory, Sehore and Gwalior Sugar Company Limited and Dabra Factory stated that the sugar industry was very heavily taxed under excise laws and further raising of water rates on the basis of treating sugarcane as cash crop was not at all justified. They opined that in the State sugarcane area per capita was the least in whole of India and it was but fair that only such water rate should be fixed as would give sufficient incentive to the cane grower. Only then it would be possible to install more sugar factories in the State. Opinion of the witnesses was also sought as to whether the water rate should bear any relation to the gross value of the produce or the net irrigation advantage. Some favoured to link up the water rate with gross produce but majority considered that due to sufficient rainfall it was reasonable that only the increase in yields should be considered as the advantage due to irrigation. The logical method would be to fix the water rate as a percentage of this net advantage only.

10.9 On the question of the share of State in the increased yield, there were divergent views ; but the general opinion was that 10 per cent of the increase in produce may reasonably be taken as the State's share.

Share of the State in the net increased yield.

10.10 What should be the relation of water-rates between (i) Irrigation by flow and (ii) Irrigation by lift, was discussed in details during the enquiry. The lift irrigation has various forms like :—

Water rates for various irrigation practices.

(i) Lift from flow canals.

(ii) Lift from storage or tanks ;—

(a) by pumps owned and operated by Government.

(b) by pumps owned and operated by private agency.

(c) by manual lift devices, e.g., Rahat, Dauria, Chhapa, Dhenki, Mote, etc.

(iii) Lift from Wells, ground water, etc.—

(a) by pumps owned and operated by Government.

(b) by pumps owned and operated by private agency.

Nearly 95 per cent of the state irrigation is done by flow. At some places irrigation by lift from tube wells or pumps installed on nalas is practised. In times of keen demand the cultivators resort to use of their own pumps or other mechanical devices for lifting the state water either from—

- (i) flow canals.
- (ii) from State tanks, or
- (iii) from Government wells.

The general opinion was that the water rates for lift irrigation done by pumps owned and operated by Government, from tube wells or nalas or storage tanks may be 1.5 to three times the normal rate for flow irrigation. For lift irrigation done by mechanical pumps owned by private agency, water-rate suggested was half the normal flow rate for the crop. The cultivators also considered that when water had to be lifted by animal or man power such as Rahat, Dhenki, Chhapa, Dauria or Mote the water-rate chargeable should be only one-fourth of the flow rate as the charges for manual lift are very high.

Flood irrigation by regulators, etc.

10.11 The basis for fixing water rates for flood irrigation by diverting nala flow was discussed. This kind of irrigation is practised for rice crop in certain district of the State and for wheat crop in Narmada Valley where, by diversion of floods by regulators, irrigation of fields along the banks of nalas is done. The general opinion was that as these works are cheap in construction and provide occasional irrigation, lower rates are justified.

Uniformity of water rates.

10.12 Our enquiry was whether uniformity in water rates all over the State is feasible or not and we invited suggestions on water rates for principal crops. The cultivators were generally silent as to the exact water-rates which should be fixed for each crop. Even during evidence, inspite of our interrogation the witnesses in several cases did not give any specific answer. The cultivators from all places except for Bhopal and Gwalior regions, considered the present water rates as suitable. For Bhopal and Gwalior regions, a reduction in water rates was demanded. From the official witnesses, Shri C. H. Sanghvi, Deputy Chief Engineer, suggested that the rates should be uniform but they should be subsidized depending on the local situation under each project. Shri R. P. Noronha, I.C.S., Commissioner, Raipur Division, suggested that as the irrigation advantage was different for different types of soils which were irrigated from irrigation projects in the State, water rates should be consolidated with the revenue rates and they should be revised at the time of the settlement.

Basis for determining compulsory irrigation cess.

10.13 This was an important item of our inquiry because of the present high cost of construction and maintenance of works. The Central Government and Planning Commission have also laid down the principle that

henceforth no major irrigation work should be undertaken unless, there is a certainty of recovering the cost of maintenance and interest on the capital. It was explained to them that the cost of construction of new irrigation works is about Rs. 500.00 per acre and the rate of interest is $4\frac{1}{2}$ per cent per annum on the capital, Rs. 3.00 per acre are required for the repair and maintenance charges in addition. It was therefore proposed to cover the repairs and maintenance charges by levying compulsory irrigation cess.

To this enquiry most of the witnesses favoured the levy of compulsory irrigation cess on the entire irrigable area under a state work whether water is utilised or not. They considered it reasonable in view of the heavy expenditure incurred on the capital cost of irrigation projects, it was but fair that the permanent holders of the commanded area should take advantage of the available supplies for which they must pay the compulsory cess which should be calculated so as to cover the running charges for repairs, establishment, drainage, etc. They considered that a levy of about Rs. 1.50 to Rs. 2.50 per acre to meet this charge should be sufficient.

As regards the proposal for a uniform compulsory irrigation cess, for areas benefitted by minor, medium and major works, witnesses stated that irrigation works whether minor, medium or major or even the lift schemes were designed to supply water so far as available for the complete maturity of the crop and therefore, they considered that all state works should be subject to similar regulations in matter of levy of compulsory irrigation cess, with the exception that for diversion works where irrigation is uncertain reduced rate of cess should be levied.

10.14 We wanted to know the opinion of public if they suggested any rebate in the compulsory irrigation cess and water rates for the works constructed in tribal areas. Rebate in tribal areas.

The general opinion appeared to be that due to expansion of cultivation, more area was being cultivated for which irrigation would be useful. Compulsory cess for works constructed in the tribal areas was not considered justified as cultivators were not irrigation minded. As regards water rates for works in the tribal areas, a concession upto 50 per cent of the normal rate was generally favoured by the witnesses.

10.15 The State Government have assumed charge of the Ex-Malguzari tanks. There are a number of minor works, constructed or in progress, under Development Blocks, some of which may have to be maintained by the Irrigation Department and others by local bodies. The Committee wanted to know the opinion of the cultivators whether some rebate in Irrigation cess and water rates should be granted for these works. Malguzari tanks and question of rebate.

The opinion expressed before us was to the effect that full rates of compulsory irrigation cess be charged on Malguzari tanks which have been improved and are being maintained by the State, inasmuch as the irrigation facilities provided are at par with the area irrigated under other state works. In the case of Ex-Malguzari tanks which were improved and maintained by local bodies or panchayats full cess should be payable to such bodies. In case where the Ex-Malguzari tanks are not improved, no cess should be leviable.

Works completed
before First Five-
Year Plan.

10.16 Proposal for levy of compulsory irrigation cess on lands already benefitted by irrigation works completed before first plan was acceptable to the people. Witnesses stated that since the irrigation cess covered the maintenance and repair charges of irrigation works only it was fair that it should apply also to all works constructed even prior to the first plan.

Tube well schemes.

10.17 The compulsory irrigation cess on tube well schemes was accepted by the witnesses.

Wet land in the
command area.

10.18 Regarding the levy of compulsory irrigation cess on land classified as 'Wet' in revenue records and situated within the command of the work, the opinion of the cultivators was that the cess should not be levied on land classed as 'Wet' as such lands had already a defined source of irrigation. It was, however, considered that if such land had once entered into an agreement, or had made use of the irrigation facilities from the State works, the wet area then should be liable for assessment to compulsory irrigation cess.

Limitation of area
subject to levy of
compulsory cess.

10.19 Regarding the area to be assessed to compulsory irrigation cess the cultivators wanted that the normal irrigable area under a project should be fixed by the State Government and compulsory irrigation cess should be leviable on this area. If some area goes out of cultivation continuously for five years, this should be declared out of command and excluded from the assessment of this cess.

Necessity of water
courses.

10.20 In the irrigated area under rice the owners of the head-fields store excessive quantity of water at the expense of cultivators of fields lower down. The water-courses or field channels can remove this short-coming. We discussed this point at length with the cultivators. It was found that in the non-rice areas, water-courses already existed at many places and the people fully realised their utility and considered them a necessity. In the rice areas, however, the cultivators did not show any eagerness for the construction of water-courses to any large extent. They were very susceptible about the utility of water-courses in such areas due to misuse by the owners of upper fields. It was felt that land required for water-courses would reduce their holdings. Under these circumstances some cultivators considered that construction of water-courses should only be done where the irrigated blocks

were long and normally the tail fields could not be irrigated. In the opinion of witnesses acquisition of land for construction of water-courses whether in rice or non-rice fields by Government was considered essential.

10.21 The question of penalty for wasting water was considered. It is the general experience that water is wasted by irrigators and the actual offender can not be traced. The witnesses considered that the cultivators should not be held responsible for the wastage of water. They considered that it was the responsibility of the Government to devise ways and means to detect and prevent the wastage. It was pointed out to the witnesses that water taken from an outlet for irrigation was not infrequently wasted, thus causing loss to state property and causing damage to other fields. The general opinion was that charges on joint basis from the beneficiaries in the irrigated block below the outlet should be leviable. Penalty for wastage of water.

10.22 The agreement system and levy of agreement rate is at present in vogue in Mahakoshal region only. Views of witnesses were sought whether this system of long term agreement should be extended to other regions also. Some witnesses favoured the extension of agreement system as in vogue in Mahakoshal area, to other regions also. They considered that the agreement should be for the main crops of each region only and not for the subsidiary crops. The view expressed by other witnesses was that the agreement system should not be extended beyond Mahakoshal. Shri Babulal Dwivedi of Dinara favoured the discontinuing of the existing system in Madhya Bharat as the area under 'Ailan' (which depends on the state of filling of the State tanks) changed from year to year which gave room for favouritism by the lower departmental staff due to the prevalent practice of charging 10 per cent extra for authorised extension of irrigated area and 100 percent for un-authorised increase in the irrigated area. Some Collectors of districts had also favoured long term agreement for irrigation of staple cereal crops in Madhya Bharat, Vindhya Pradesh and Bhopal regions. Irrigation agreement.

10.23 The water-rates are collected in Mahakoshal region through the Irrigation Panchavats: in Madhya Bharat region, it is recovered directly from the cultivators by the Irrigation Department, whereas in the Vindhya Pradesh and Bhopal regions, collection is made through the Tahsildars (Revenue Department). Views of witnesses in regard to a uniform system of collection of irrigation revenue were collected. Collection of Irrigation revenue through panchayats.

The witnesses from Mahakoshal favoured the collection of irrigation revenue through the Irrigation Panchavats as at present, as this system had worked well since long. The witnesses from Madhya Bharat, Vindhya Pradesh and Bhopal regions preferred the collection to be done by the Revenue Department. It was gathered from the evidence given by the witnesses that they are in favour of uniform system of collection of irrigation revenue, throughout the State for administrative convenience.

Method of collection.

10.24 With regard to the method of collection of water rate dues and the maintenance and operation of the irrigation works of the following categories:—

- (a) Major and Minor works constructed by the Irrigation Department from their funds or from the funds of the Agriculture Department.
- (b) Ex-Malguzari, Ex-Zamindari and Ex-Jagirdari tanks now vested with the State Government.
- (c) Other works, being built as Minor Irrigation Schemes.

The unanimous opinion of the cultivators was that there should be a uniform procedure for collection of water rates and maintenance and operation of Major and Minor Irrigation works constructed by the Irrigation Department. For the Minor works under the Community Development Programme and the improved Ex-Malguzari tanks which were numerous in number and vastly scattered, the opinion was sharply divided. In most cases, the witnesses (cultivators who were the actual users of the storages) considered that due to party feelings in villages, management of these work by the Panchayats would not at all be possible. Collectors of the districts mostly corroborated the same view. The Deputy Chief Engineer, Irrigation, has stated that the operation and maintenance of such small works, viz., Community Development Schemes and Ex-Malguzari Tanks irrigating upto 100 acres (40.5 hectare) should be the concern of the local bodies, viz., Gram Panchayat, Janpada Sabha and Municipal Corporation as the case may be. All tanks irrigating more than 100 acres (40.5 ha.) should be under management of the Irrigation Department. A legislation on the lines of the Madras Compulsory Labour Act, 1858 (Kudimarrammatt Act) as amended by the Madras Act VIII of 1956, would be necessary to bind the beneficiaries of such small works for proper maintenance and operation. The general opinion was that the water rates for these works should be consolidated with the land revenue rates and that the collection of canal revenue could be entrusted to the Revenue Department.

Duties of Irrigation Panchayat.

10.25 The present duties of the irrigation panchayats in Mahakoshal region are—

- (a) Assist the officers of the Irrigation Department in detecting and preventing encroachments on canal lands, prevent damage to irrigation works and report any willful damage caused to irrigation works.
- (b) Assist the officers of the Irrigation Department in arranging for the construction of water-courses, in recording and checking irrigation and in making measurements and settlement of disputes.

- (c) Collect irrigation revenues and remit it to the Treasury, and
- (d) Arrange for the repair of water-courses.

It was enquired whether duly constituted Gram Panchayats can discharge the above duties satisfactorily and result in economy and efficiency. The cultivators from Mahakoshal stated that the duties allotted to the Irrigation Panchayats were in the interest of efficiency of irrigation. Regarding the capacity of the duly constituted Gram Panchayats to discharge the present duties of Irrigation Panchayat, the opinion was much diverse. Shri V. V. Giri, of Land Records Department was of the opinion that Gram Panchayats could easily perform the duties of Irrigation Panchayats. The Deputy Chief Engineer, Irrigation held a contrary opinion. The Deputy Director of Agriculture, Wheat Zone, considered that the duties of Irrigation Panchayats could be transferred to Gram Panchayats. The Collector, Durg District, was of strong opinion that Gram Panchayats would not in any way do better as there were sharp party feelings in villages. In his opinion the Irrigation Panchayat system should continue. Other cultivators, however, told that Gram Panchayats would be a popular agency and could handle conveniently the work of Irrigation Panchayat. Thakur Lakhan Singh of Murwara Tahsil, Jabalpur district, expressed that the present day Gram Panchayats were not capable of discharging the duties of Irrigation Panchayats. He did not expect any saving in expenditure or increase in efficiency if Irrigation Panchayats were replaced by Gram Panchayats. Shri Nand Kishore Sharma, M.L.A., Lalburra, wanted that maintenance of irrigation works should be looked after by village Irrigation Committees or some agency on the advice of Gram Panchayats. In general a separate institution like irrigation panchayat to perform above duties was favoured.

10.26 Suggestions were invited on the measures to be taken for effective distribution of supplies by Irrigation Panchayat. Suggestion on improvement in Irrigation Panchayat.

It was generally felt that no enthusiasm was shown by the Irrigation Panchayats in discharge of duties because they were paid meagre fees for collection of irrigation revenue, as administrative commission. Shri Laxman Singh, Ex-Malguzar, village Sarsoda expressed that the Irrigation Panchayats should be given more powers so as to discharge the duties in an effective manner. Shri Har Prasad Sharma was of the opinion that Irrigation Panchayats should have the same rate of commission as is given to patels in the Revenue Department. Shri Ajodhya Prasad Sharma, President, Janapada Sabha, Mahasamund, wanted that the scale of fees and commission should be raised. As regards the introduction of sliding scale of fees and commission payable to the Panchayats for the collection of revenue, (Higher rates to be paid for higher percentage of collection and *vice-versa*) it was not favoured by many. The Extra

Assistant Director of Agriculture, Raipur, was not in favour of payment of collection commission on a sliding scale. Shri Amoli Ram of village Kuhkuha, Shri Laxman singh of village Dahdaha, Raipur district, suggested the following basis for payment of commission—0.12 nP. per rupee of collection for first five hundred rupees; 0.10 nP. per rupee for next Rs. 500 and 0.06 nP. per rupee for sums above Rs. 1,000. Shri Mahadeo Prasad Tiwari of Brahmanpara, Durg, stated that the rate of collection commission should be the same as that given to Patels of Land Revenue Department for collection of land revenue.

General complaints
regarding supplies.

10.27 The general complaint of short supply was made to us at several places during our tours. In Durg District the complaint was that water is not issued for 'Biasi' and for maturing of paddy. The tail areas do not receive adequate supplies many a time. In the Balaghat district a demand was made for issuing water for nurseries of paddy. In Vindhya Pradesh many tanks having sluices at high level, are not capable to pass supplies in the channel when the water level goes down. In Bhopal region the complaints of high rates was made.

Irrigation required
for rabi and perennial crop.

10.28 Cultivators from Mahakashal complained that they are not able to extend rabi and perennial crop cultivation as there is no guarantee from the department of the availability of supplies.

Other complaints.

10.29 The cultivators in Madhya Bharat complained that they should not be charged for Nami dhan. Under Bhind canal the complaint was that due to the proximity of out-lets large area is water logged and compensation for 'Kharaba' is not sanctioned in time. They also appealed that in the interest of horticulture they should not be charged for irrigation of fruit gardens till the plant start giving fruits, instead they should be charged rates for the other seasonal crops sown in between the rows of trees. The general demand was that supplies through out-lets should be properly regulated by the department and channels maintained in good order. The cultivators from Madhya Bharat, Vindhya Pradesh, and Bhopal complained of the double assessment made by Irrigation Department by levying water rates on lands paying 'Adan' and 'Abi' taxes.

10.30 The committee has taken note of these complaints and recommended suitable measures to remove the short-comings.

CHAPTER XI.—CRITERIA FOR WORKING OUT BET- TERMENT LEVY AND WATER RATES AND THEIR FIXATION

11.1 We have reviewed in the preceding chapters rain-fall and soil conditions met with in different districts of the State. We have also made an appraisal of benefit and cost of different types of irrigation works constructed in the past and during the Plan periods. In Chapter IX, a detailed review of prevailing water rates in different regions of the State and also their comparison with the rates in neighbouring States has been made. Introduction.

11.2 When the cost of works was relatively low it was comparatively an easy matter to make them self-supporting by the levy of moderate irrigation water rates. Of late, however, the costs have gone up rapidly. A stage has been reached when the levy of water rate alone could not make them self-supporting. With costs going even beyond Rs. 500.00 per acre, the interest charges alone come to over Rs. 22.00 per acre. Cost of maintenance is about Rs. 3.00 per acre. It is difficult to realise about Rs. 25.00 annually through irrigation water rates only. It has, therefore, been decided by the Government of India that a part of the capital should be recovered as a special charge, being termed as a 'Betterment Levy' over a period of 15-20 years. The balance capital at charge would then be such whose interest charges coupled with operation and maintenance costs could be recovered through water rates only. The capital so recovered could be invested on new works.

11.3 It is a fact that the cost of land in the tract which is provided with Irrigation facilities goes up considerably. (See App. III-18). This is an indirect benefit to the owners of the land. They can easily afford to pay a portion of this unearned income to the Government in the form of "Betterment Levy". After introduction of irrigation the cultivators have to resort to intensive cultivation but they cannot attend to the entire holdings where these are comparatively large. So they can afford to sell a part of these holdings in order to pay for the "Betterment Levy"

11.4 Basis for evaluating the quantum of betterment levy, which should be recovered from the beneficiaries differs from State to State. One or the other of the following criteria have been adopted by various States— Basis for fixation of betterment levy

Criterion-1.—Increase in the market value of land benefitted between the date of commencement and date of completion of a project (Bombay, Mysore, Punjab, Rajasthan, Himachal Pradesh).

Criterion-2.—Difference between the market value of wet or irrigated land and dry or unirrigated land at the completion of a project in nearby area (Andhra Pradesh).

Criterion-3.—Increase in the value of land equated as a multiple of the increase in value of produce, over a certain period (Andhra Pradesh, Kerala, Madras, Orissa and Himachal Pradesh).

Criterion-4.—Recovery of the whole or a portion of the capital cost of a project (Madhya Pradesh and Punjab).

Selection of suitable criterion.

11.5 The criterion No. 1 is not considered suitable as price of land is susceptible to great changes due to speculative buying and selling during busy period of construction and other extraneous causes, viz., springing up of new industries and introduction of roads and railways which do not directly result due to irrigation development. Moreover, it does not take into consideration the rise in value of land due to irrigation, as the evaluation is proposed to be done before actual irrigation starts.

11.6 Next, due to great variation in the texture, position, slope, fertility and drainage of soils of different fields in the same area, adoption of the criterion No. 3, which takes into account the value of land equated as a multiple of increase in value of produce, is not possible, moreover it is too complicated for adoption.

11.7 Therefore we recommend the adoption of Criterion No. 4 as the basis limited by condition imposed in Criterion No. 2. The upper limit of recovery shall not exceed 50 per cent of the difference between the market value of irrigated land and dry land as specified by the Taxation Enquiry Commission (1953-54) in their report.

Betterment Levy Act of M. P.

11.8 According to M. P. Taxation Law (Amendment) Act, 1956 (No. VII of 1956) of the erstwhile M. P. State, betterment levy for plan works was enforced as below:—

(a) first five annual instalments should be three per cent of the cost of the project per acre; and

(b) next ten annual instalments should be $4\frac{1}{2}$ per cent of the cost of the project per acre.

11.9 Average cost of an irrigation project in these days is Rs. 500.00 per acre and the two series of annual instalments of Rs. 15.00 for 5 years and Rs. 22.50 for 10 years would amount to collection of Rs. 300.00 per acre in 15 years. We feel that this heavy recovery can not be borne by the cultivators as this has to be limited to 50 per cent of the difference in the value of irrigated and unirrigated land.

11.10 In order to assess the rise in land values, we have collected the information from the Collectors of districts and other officers and is given in the appendix III-18. The average increase in land value works out to Rs. 280.00 per acre.

Data regarding increase in land values.

11.11 The Taxation Enquiry Commission (1953-54) has specifically laid down that the quantum of betterment levy shall not be more than 50 per cent of the increase in value of land due to irrigation. Our calculations prove that this increase in value of land on an average is about Rs. 280.00 per acre. The recoverable amount is to be limited to Rs. 140.00 per acre. This should be paid by either a single payment of Rs. 140.00 per acre or by annuities for 20 years of two series as given below:—

Maximum limit of betterment levy.

First Series—Rs. 8.00 per acre annually for 5 years.

Second Series—Rs. 12.00 per acre annually for 15 years.

These recoveries would amount to realising 1.6 per cent and 2.4 per cent of the cost against 3 per cent and $4\frac{1}{2}$ per cent of cost per acre as mentioned in the formula of the Betterment Levy Act. The cash recovery from the proposed instalments amounts to Rs. 220.00 per acre. The new proposal would amount to a reduced recovery* of (Rs. 300—Rs. 220) Rs. 80.00 per acre. This reduced amount of betterment levy will be fair to the cultivators as well as to the Government.

11.12 The Committee recommends that the State Government should accept contribution in form of land from holdings above the prescribed size. By this means the State will obtain lands needed for:—

Land contribution in lieu of betterment levy.

- (i) Settling persons whose lands are submerged by reservoirs or are required for other purposes connected with the projects.
- (ii) Settlement of displaced persons.
- (iii) Effecting improvement in the Agricultural economy of the villages under the project by consolidating holdings, making uneconomic holdings economic, assignments to landless labours etc.
- (iv) Community purpose such as roads, markets and and grazing grounds.

11.13 The date from which the levy is to be effected should reasonably depend on (1) the consciousness of cultivators with regard to utilisation of irrigation potential made available (2) the period of development of irrigation (which can be ascertained by running the canal for

Date of effecting the levy.

*Old proposal as per Act for a project costing Rs. 500.00 per acre $500 \times 3 / 100 \times 5$ years + $500 \times 4 \frac{1}{2} / 100 \times 10$ years = 75 + 225 = Rs. 300.00 per acre.

New proposal $8 \times 5 + 12 \times 15$ = Rs. 220.00 per acre.

one or two seasons) and (3) the period required for fertilisers to penetrate up to the root zones and thereby increase the productivity. In our opinion the levy should start after the third year of operation of work. Other States have also proposed charging the levy after the third or fourth year.

Coverage of betterment levy.

11.14 The betterment levy should not be charged on the whole of the culturable commanded area under the work but should be levied on area under the irrigable command of the project. Such irrigable command should be clearly demarcated and it should be notified to the permanent holders of the area that irrespective of whether the irrigation facilities provided at the outlets are utilised or not, they will have to pay the betterment levy. The levy shall be chargeable on all new works and extensions of old works, costing more than Rs. 5 lakhs or irrigating more than 1000 acres of land whichever is less. It is not considered to levy betterment charges on old irrigation works i.e., projects completed before April 1, 1951.

Adjustment of price changes.

11.15 The levy instalment may prove difficult to pay in a year of sharp fall in prices of agricultural produce which will reduce the farmer's income. There should, therefore, be provision in the enactment for relief in the form of postponement of payment in such a year of decline in prices and in case of the falling trend in the prices continued for number of years, grant of out right remissions may be considered. Similarly in case of ever increasing prices the betterment levy should be raised accordingly.

Agency for collection.

11.16 Since the collection of betterment contribution would involve handling of big sums of money, it is suggested that the collection should be done through Revenue Department.

Principles of fixing water rates endorsed by C. P. Irrigation committee, 1929.

11.17 In old Madhya Pradesh, the principle on which water rates should be fixed, were considered by the C. P. Irrigation Committee (1929-31). The following is extracted from the Committee's report.—

“The Indian Taxation Enquiry Committee (1924-25) in paragraph 138 of their report, summed up the principles of general application governing the fixation of water rates, as follows :—

- (i) Wherever possible the charge for water should be separated from the charge for land.
- (ii) The minimum charge, except in the case of protective works, or when a special concession is given to particular area or class of cultivators, should be the cost of supplying the water, that is to say the cost of maintenance of the irrigation works plus interest on the capital cost.

- (iii) The maximum should be a figure so fixed as to take for Government the whole of the increase

in the return from the land except such portion as will be just sufficient to induce the cultivator to take the water.

- (iv) The normal should be a moderate share of the value of the water to the cultivator.
- (v) This value will vary with prices, with the demand for water, with the reliability of the sources of the supply and with quality in so far as, for instance, it carries silt, but should not bear any relation to the cost of supply once the figure of cost is covered.
- (vi) The rate should be fixed per acre or the unit of area and should take account of the value, as so determined, and of the quantity used as estimated, with reference to a schedule of proportional requirements of different crops in the locality.
- (vii) The rates should be, as few as possible, and they should be examined with a view to increase or decrease periodically not less than once in ten years.
- (viii) When the demand is not constant, and the cultivators agree to pay for water, whether they require it or not, a reduced payment for a term of years may be accepted.
- (ix) When a guarantee of supply is newly given, it is legitimate to take a reasonable share of the addition made to the capital or annual value of the land by such guarantee. This should be a charge on the owner and over and above the charge on the occupier for the use of the water. In the case of controlled rent, there should be provision for recovery from the tenant as under the Agra Tenancy Act.
- (x) The rates under protective works should be examined periodically with the rest, unless there are special reasons for subsidising the cultivators under these works at the expense of the general tax payer".

11.18 The principle adopted in the erstwhile Gwalior and Bhopal States were broadly the same. In Vindhya Pradesh and Holkar States these principles were not vigorously applied. The conclusions drawn by the Taxation Enquiry Committee (1924-25) hold good even to day except that we would like to suggest some modifications in item (ii). Experience of the working of Irrigation Projects in the State has shown that the revenue realised does not cover the maintenance charges of irrigation works plus interest on the capital cost, hence the approach should be to realise a part of the interest charges. What portion of the interest charges should be recovered, will be discussed later.

Present Day Consideration.

Diversity of water rates.

11.19 Water rates are charges payable for the actual use of water depending on different seasons of the year, the type of crop irrigated and various other factors. At present there are different water rates for the same crop in different regions of the state and it also appears that they were not fixed on any rational basis. In the past the value of a crop at maturity served as a rough guide for fixing the rates. There is at present multiplicity both in principle and in assessment of rates from region to region and even for different works in the same district. This may very well be observed from schedule of rates of Mahakoshal given in Chapter IX.

Need for revision of water rates.

11.20 The present water rates current in Mahakoshal and Madhya Bharat regions were last revised in December 1953 and July 1954 respectively. In the Bhopal and Vindhya Pradesh regions also they were fixed about the same time viz. May 1953 and January 1954. The prices of farm products have since gone up considerably. We also feel that the Grow More Food campaign has given a great fillip to improved methods of cultivation and there has been a steady increase in yield of crops. This has resulted in increased benefits to the cultivators, and the state would be justified in apportioning part of these substantial benefits in order to make funds available for financing other projects.

11.21 Besides the above, if we analyse the new projects it is observed that they are comparatively more expensive, not only due to increased cost of wages and material, but due to more favourable sites of projects having been exploited already. In order that the investment should be sound it is necessary that revenue from an irrigation work should be sufficient enough to enable the Government to recover both the maintenance and interest charges on the capital outlay. It is for this reason, that when the Irrigation works were first started in India, the sanction of a project was considered on the basis of its satisfying the 'Financial productivity test'.

Financial returns of old canal systems in Madhya Pradesh.

11.22 In this State, on the other hand, all the irrigation works excepting few were taken up as 'protective works'.

This will be clear from the figures given in the table below :—

Serial No.	Works for which capital and revenue account is maintained	Capital Cost Rs. lakhs	Gross receipt (1958-59) Rs. lakhs	Working expenses Rs. lakhs	Net Receipts Rs. lakhs	Percentage of net revenue to capital outlay	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Harsi and Bhind Canals.	156.11	13.27	3.77	9.50	6.09	works with a return of less than 4½% are unproductive.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2	Other large Canal Sys-tem.	437.14	16.56	9.05	7.51	1.76	
3	Selected me- dium works	113.93	2.59	2.44	0.15	0.13	

It is observed that even the existing works except Harsi and Bhind canals which were constructed at about one-fifths of the present day cost, are not giving adequate return.

11.23 The State had launched a heavy programme of construction of irrigation works since the beginning of the First Five Year Plan to increase the low percentage of irrigated area as described earlier. The figures below give irrigation potential and actual utilisation for the Plan works up to the year 1958-59 in various region of the State. (See details in appendix III-19).

Position regarding working of plan projects and utilisation of potential created.

Potential created/Area Irrigated acres				
	1955-56	1956-57	1957-58	1958-59
	58,800	81,237	1,04,958	1,34,048 +1,500*
For the whole State	35,540	36,003	53,917	60,005 +723*

11.24 In para 11.17 we have enumerated the principles followed by the Indian Taxation Enquiry Committee regarding the fixation of water rates. Out of the various criteria the important ones relevant to the fixation of water rates are numbers (v) and (vi). According to these the water rates should vary with prices of produce, demand of water and reliability of source of supply and requirements of water for different crops in a particular locality.

Criteria for fixing of water rates.

11.25 Keeping the above in view we have grouped below the irrigation works in various districts of the State in two zones, viz :—

Crop zone for fixing water rates.

- (a) The rice zone, covering the districts of Raipur, Bilaspur, Durg, Balaghat, Bastar, Surguja, Raigarh, Sidhi, Shahdol, Mandla, and
- (b) The wheat zone or mixed crop zone, which covers the remaining districts of the State. In the light of studies made on rainfall and soils in chapter II we are of opinion that the requirement of irrigation for all crops in general and paddy, wheat and sugarcane in particular are different in the above two zones.

*?Area irrigated under tubewells.

In the rice zone normal year's rainfall is generally insufficient for maturing medium and late varieties of paddy, while in the wheat zone rainfall in kharif season is below the requirement for paddy crop. During rabi season there are much variations in the rainfall from year to year and from region to region.

Water rates for crops.

11.26 Rice crop which is grown during monsoon season in the State gives different yields under rainfed conditions depending on the distribution of rainfall. We have classified the data collected by us from various sources in the following manner :—

Produce of crops from—

- (1) Unirrigated and unmanured fields.
- (2) Irrigated and unmanured fields.
- (3) Manured and unirrigated fields.
- (4) Irrigated and manured fields.

Irrigation advantage for paddy crop.

11.27 For rice crop, data has been collected from the principal rice growing districts of Bilaspur, Raipur, Raigarh, Durg, Balaghat, Seoni, Jabalpur, Bastar, Mandla, Shahdol and Sidhi. Calculations of the net irrigation advantage are given at Appendix III-14 (b). Following figures give the yield of paddy—

				per acre	per ha
				mds.	ql.
(1) Un-irrigated and unmanured	..	..	..	9.30	8.47
(2) Irrigated and unmanured	..	..	..	15.64	14.41
(3) Manured and un-irrigated	..	..	..	15.40	14.18
(4) Irrigated and manured	..	..	..	23.50	26.65

The benefit of irrigation has been worked out to be 7.2 mds. (6.63 ql.) of paddy which is equal to 4.5 mds. (4.146 ql.) of rice per acre (per ha). We have also gone through the results of the large scale experiments on paddy conducted by the Commissioner Raipur Division, under Thakurdaya tank in Mahasamund Tahsil of Raipur District and we have collected similar data from other experiments and the figure worked out is 5.26 mds. (4.829 ql.) of rice which is fairly close to the figure of 4.5 mds. (4.14 ql.) obtained from the evidence.

11.28 The irrigation advantage per acre (per ha.) by taking the average of two different analysis of irrigation advantages works out to 4.87 mds. (4.48 ql.) of rice. This is valued at Rs. 73.00 (Rs. 180.31) at the rate of Rs. 15 per md. (Rs. 40.18 per ql.). Added to this the extra yield of paddy due to irrigation estimated

to be about 7.2 md. per acre (6.63 ql. per ha) gives an extra benefit of Rs. 7.2 per acre (Rs. 17.78 per ha). The total benefit works out to Rs. 80 per acre (Rs. 197.6 per ha) for rice zone. For the wheat and mixed crop zones, the net benefit is Rs. 104.00 per acre (Rs. 256.8 per ha). Taking 10 per cent as the share of the State, the rates proposed are as below :—

- (a) Rice zone—Rs. 8.00 per acre (Rs. 19.76 per ha) on long-term agreement.
- (b) On demand—Rs. 12.00 per acre (Rs. 29.64 per ha).
- (c) —Rs. 10.0 per acre (Rs. 24.70 per ha). On one year's agreement.

11.29 The present rates of paddy irrigation under the long-term agreement in Chhattisgarh region ranges from Rs. 2.00 (Rs. 4.94) minimum to Rs. 8.00 (Rs. 19.76) maximum. Generally the arguments advanced for maintaining status-quo in Chhattisgarh region are as follows :—

Views expressed by cultivators of Chhattisgarh.

- (a) The irrigation supplies are not required every year for paddy crop due to sufficient rainfall, and normally irrigation is needed once in five years.
- (b) The income of irrigators is limited due to single crop cultivation.
- (c) The cost of raising crop has gone up due high prices of farming.

We have carefully weighed these points individually. Regarding the requirement of irrigation, the data collected by us in Chapter II shows that in the period of 50 years from 1908-58 there were 38 years when irrigation could be profitably used. The advantage of irrigation is thus derived in four out of five years rather than once in five years as reported. Regarding the limited income due to single crop grown, it is surmised that the idea of reduced income due to single crop would gradually change with the accepted principle in agriculture that the same crop gets much higher yield when late varieties are generally sown in the irrigated area. In heavy soils of the commanded area, the second crop of pulses, usually known as 'Utera', is invariably grown. Regarding the third point, we very much realise the effect of rising cost of cultivation. This has been given due weightage as the net benefit due to irrigation has been taken into account for fixing water rates.

11.30 Our State has diverse conditions of rainfall and soil as we have described in Chapter II and on account of this the yield of wheat crop varies considerably. While on study tours, we marked considerable difference in the figures of yield quoted by the witnesses. As in case of rice, we have statistised the figures of produce of wheat crop grown under dry, irrigated but not manured, manured but un-irrigated, and irrigated and manured conditions. While

Benefits of Irrigation for wheat crop.

computing the average yield of irrigated wheat crop, we noticed that the total produce per acre (per ha) varies from 7.5 mds. (6.90 ql.) in Raipur area to 12.7 mds. (11.70 ql.) in Gwalior area. [See Appendix III-14 (a)] Similarly average figures obtained for Vindhya Pradesh, Bhopal, Indore and Jabalpur are also variable. In the districts of Raipur, Bilaspur, Durg, Balaghat, Bastar, Sarguja, Raigarh, Mandla, Sidhi, Shahdol, the irrigation advantage is only 2.4 mds. (2.48 ql.) which is valued at Rs. 40.15 per acre (Rs. 100.03 per ha) which is the lowest return. Ten per cent of this is Rs. 4.00 per acre (Rs. 9.88 per ha). We fix this rate for wheat crop in the rice growing districts as mentioned above. In the remaining districts of the State additional benefit is near about the figure of 5 mds. per acre (4.61 ql. per ha) except in the district of Gwalior, Sheopuri, Bhind, Morena and Datia where yield is slightly higher. For the sake of uniformity of rates the irrigation advantage of 5 mds. per acre (4.61 ql. per ha.) is accepted for all the districts (except rice growing districts). The total irrigation advantage in wheat growing districts is Rs. 75.50 per acre (Rs. 186.96 per ha.) and accordingly we fix a rate of Rs. 7.50 per acre (Rs. 18.69 per ha.).

'Adan' and 'Abi' rates in Madhya Bharat, Vindhya Pradesh and Bhopal.

11.31 During our tours in Madhya Bharat and Vindhya Pradesh regions the cultivators stated that they were already heavily taxed due to the levy of 'Adan' rates and 'Abi' rates respectively. In addition to this, they had to pay high water rates as well. Similarly, in Bhopal there were cases of heavy payment of 'Adan' rates in addition to water rates. 'Adan' and 'Abi' rates should be considered as water rates which were merged in the land revenue in the erstwhile State. We have examined this question in further details as there were persistent complaints made in this regard throughout our tours. The exact nature of this problem has to be understood along with its historical background.

11.32 Madhya Bharat, Vindhya Pradesh, Bhopal and other areas comprise old feudatory State where the administration was of the Indian Princes. The cultivator who at his own expenses created means of irrigation and irrigated his land, was liable to be assessed at a higher rate of tax, known as 'Adan' rate or 'Abi' rate for the irrigated portion of the land. This liability was fixed at the time of settlement and it continued till the next settlement (a period normally of 20 years). During this period, the liability to pay the enhanced rate continued because of the settlement record although even after some time the irrigation ceased due to causes beyond the control of the cultivator, e.g., the source of water viz., wells or nalla running dry. This right to levy an increased rate of land revenue [which is ordinarily Rs. 16.00 to 20.00 per acre (Rs. 39.52 to 49.40 per ha.) in Madhya Bharat] on the 'Adan', i.e., irrigated land, was considered under law as proper, because the land was considered ultimately to belong to the Ruler. The Ruler having right to tax the land, could also share

increased income of the cultivator (by way of increased rate of tax on the irrigated land), though he (the Ruler) had in no way contributed for the means to develop the yield of the irrigated land. The levy of such increased tax in the shape of 'Adan' is nothing short of a tax for irrigation.

11.33 In the pre-independence era this unjust burden on the cultivator did not attract much attention. This aspect of the problem was impressed on us particularly when the mention of irrigation tax has appeared in the changed context of a welfare state. The present practice prevailing in the Mahakoshal region regarding irrigation tax appears to us to be based on the just and correct principle of levy of water rate. Theory of water rate on irrigation is clear and logical. *viz.*, that this tax on irrigated land should be levied, when the water to such land is supplied through sources created at the cost of Government. The cultivator pays for the price of water he receives for irrigation purpose by way of water rates.

11.34 This burden of the old 'Adan' rates is really unjust as in the State majority of cultivators pay to Government for water supply services; the unfortunate cultivator of Madhya Bharat has to pay for no facility provided by Government. Quite a considerable part of land revenue consists of such charges for which the cultivator gets nothing. This is really not desirable, particularly, when under our new laws of ceiling a cultivator now irrigating his land at his own cost by newly constructed well, will be considered as a cultivator of dry land and will pay the ordinary dry land tax.

11.35 This Committee, on the other hand, while realising the obvious injustice to the said 'Adan' cultivator, cannot go beyond its scope of enquiry and can, under the present circumstances, only request Government to consider and examine this problem with sympathy and give necessary relief.

11.36 The average figures of yield per acre (per ha) obtained from all the districts of the State are given below:—
 Benefit of Irrigation for sugarcane crop.
 Irrigated but not manured—36.67 mds. per acre (33.812 ql. per ha.) and unirrigated—27.5 mds. per acre (25.34 ql. per ha.); irrigated and manured—54.30 mds. per acre (50.026 ql. per ha.). The yields stated are in terms of gur only.

11.37 It may be seen that this crop is generally grown at great expense and requires lot of labour, adequate manure and fertiliser and an assured supply of water. It is for this reason that the yield of irrigated and manured crop is very nearly three fold the yield of dry crop. This has also been confirmed from the figures obtained for the Sarda Canal Project in Uttar Pradesh.

The method adopted for calculating the irrigation advantage is as below :—

Value of irrigated and manured crop of 54.3 mds. per acre (50.026 per ha.) in form of gur @Rs. 18.3 per md. (Rs. 16.85 per ql.) is Rs. 994 per acre (Rs. 2455 per ha.).

The expenditure per acre (per ha) on raising this crop is Rs. 503 (Rs. 1242.00) and thus the net value of produce is Rs. 491.00 (Rs. 1213.00)..

Similarly, for unirrigated crop the net value of dry crop is Rs. 392.00 per acre (Rs. 795.39 per ha.). The figures for raising unirrigated crop are not available but referring to the figures given at page 97 of the Criteria For Fixation of Water Rates and Irrigation Projects, the cost of production is estimated to be one-third of that incurred for raising irrigated crop, which works out to Rs. 158.00 (Rs. 390.30 per ha.). The net profit on unirrigated crop is (Rs. 322-158) Rs. 164 per acre (Rs. 405 per ha.). The net irrigation advantage thus equals to Rs. 491—164=327 per acre (Rs. 803 per ha.). Sugarcane is a cash crop and the quantity of State's share in this advantage has to be fixed. In view of the fact that cultivation of this crop in the State is yet far less than the requirement, it is desirable to encourage the cultivation of this crop in Vindhya Pradesh, Mahakoshal and Indore areas.

Water rates for
sugarcane.

11.38 In the districts of Gwalior, Bhind, Morena, Shivpuri, Sehore, Raisen where sugarcane cultivation is practised on systematic lines since long the cultivators have become aware of the technique of cane cultivation and derive high yields. Regarding works in these districts, for which water supplies in summer months are assured, rate of Rs. 20.00 per acre (Rs. 49.40 per ha.) which represents the average rate prevalent in the neighbouring districts of Uttar Pradesh and Rajasthan, is recommended. At other places, where supply is not assured, a concession in water rates should be given to entrepreneur, because the cultivators do not derive full benefit. For such works a rate of Rs. 12.00 per acre (Rs. 29.64 per ha.) is proposed.

Water rates for
other crops.

11.39 Besides the irrigation of three important crops described above *viz.*, Rice, Wheat and Sugarcane no large scale irrigation of other crops is practised in Madhya Pradesh. Field data of yield being not available for other crops *viz.*, Jowar, Groundnut and Cotton we have fixed the irrigation rates for these crops based on similar crop rates in other States. We have drawn out a complete schedule

of Water rates for irrigation of crops and water consumed for non-agricultural purposes and is given below :—

Schedule of water rates for the supply of water by flow from State Irrigation Works in Madhya Pradesh

Name of crop	Rice zone per acre per crop (Raipur, Durg, Bilaspur, Raigarh, Bastar, Surguja, Balaghat, Shah- dol, Sidhi, Mandla)			Wheat and mixed crop zone per acre per crop	
	Long-term agreement	Period of agreement	Demand rates	One year agreement rate	agreement
(1)	(2)	(3)	(4)	(5)	
1 Rice	8.00	5 years	12.00	10.00	(a)
2 Wheat (d) (f)	4.00	7.50	
3 Sugarcane	20.00	20.00	
4 Sweet potatoes, ground- nuts (Kharif), and turmeric.	6.00	6.00	
5 Cotton (Kharif), Singhara	8.00	00	
6 Garden crops such as Chillies, Brinjals, Po- tatoes, Radish, cucum- ber, Water melons Go- urds, Ladies fingers, Arum Garlic, Zira, Mathi, Lettuce, cori- ander, and other green vegetables, or- chard and rubber plant.	20.00	20.00	(c)
7 Poppy	9.00	9.00	
8 Tobacco (Kharif)	9.00	9.00	
9 Castor oil plant (Kharif), other Juar, thatching grass, Mung (Kharif) Urad, Bagra, Kodo, Sawan, Sun Flower (Kharif), Soyabeans, Niger and other minor kharif crops.	4.00	5.00	
10 Sun Hemp clover Ber- seem and Lucern and other fodder crops.	15.00	15.00	
11 Groundnuts (Rabi), cotton (Rabi), Summer Juar, Winter rice, Bamboo Plants, Mung Rabi, Sun flower (Rabi), Garbeans and Tobacco (Rabi).	8.00	8.00	
12 Castor oil plant (Rabi) Oats, Musterd, batra, peas, Soyabeans (Rabi), Barleya.	6.00	6.00	

	(1)	(2)	(3)	(4)	(5)
13	Grams .. ..	..	..	3.00	6.00
14	Barley (Rabi) .. ..	..	..	5.00	5.00
15	Submerged area rates .. ..	..	..	..	..
16	Pan, plantains and Mul- beri plants (perennial)	..	..	20.00	20.00
17	Preparing land for cul- tivation for ploughing only.	..	..	2.00 as col. 4 from 1st July to 31 December. Rs. 4.00 from 1st Jan. to 30th June.	

(B) For non-agriculture purposes

- 18 Water supply to village tanks. Rs. 3.00 per 10000 cft. from 15th July to 31st October and Rs. 6.00 from 1st Nov. to 15th July.
- 19 Water supply for industrial purposes. Rs. 6.00 per 10000 cft.
- 20 Water supply to corporation and Towns. Rs. 6.00 per 10000 cft.

(a) villages under command of works in Jabalpur, Damoh, Sagar Chhindwara, Betul, Hoshangabad, Khandwa, Seoni, Narsingpur Districts will have the option to come under long term agreement for Rice crop as fixed for rice zone viz. Rs. 8.00 per acre for agreed areas and Rs. 12 per acre for area irrigated on demand.

(b) Sullage water rate for irrigation will be Rs. 90 per acre.

(c) Rate for complete irrigation of crop. If the crop is sparsely irrigated a rate of Rs. 12.00 per acre in both zones is payable.

(d) For wheat irrigation under works in Sagar and Jabalpur districts the long term agreement system should be abolished at the expiry of present agreements and one year agreement introduced.

(e) Sullage irrigation rates for vegetables and orchards around the city of Bhopal and Sehore will be Rs. 60 per acre.

(f) With sullage water Rs. 30 per acre.

(g) (i) The rate for lift irrigation by Government should be double of flow rates.

(ii) The rate for lift irrigation by mechanical pumps installed by private agency will be half the normal flow rates. For lift by 'mote' or other manual devices the rate will be 1/4 of the normal flow rate.

(h) Ten percent extra charge over the water rate for the crop be levied for applications received after the fixed date.

(i) For wastage of water charges at bulk rate as per rates in items 18-20 be charged.

(j) When water is wasted and offenders are not traceable, joint levy on all the cultivators under the water course or field channel should be levied on bulk rates.

(k) In order to encourage double cropping on the irrigated area, water rate for the following rabi crop should be charged at half the rate fixed for rabi crop when irrigated alone.

(l) The cess is leviable both on areas under old and new works exception is made for small works grant-in-aid and permanently settled rates and reductions in levy recommended for ex-malguzari tanks submerged tanks and works in tribal areas.

- (m) In case two or more crops are grown simultaneously in the same field the water rates for the major crops only shall be charged.
- (n) When surplus water is available in the hot weather, one or two, watering should be given for green manuring crops *viz.*, Sann, Dhancha, etc., free of charge.
- (o) Rates for independent lift schemes will be (a) Rs. 1.00 per 15,000 gallons of water when pumps are owned and operated by the Government and (b) no charge will be levied when pumps are owned and operated by private agencies provided irrigators obtain prior permission of the department for pumping water from natural sources of water.
- (p) The rates are applicable to state managed works except for petty irrigation works for which lower rates are fixed and are given separately.

11.40 Minor irrigation projects are being executed under Agriculture, Irrigation and Community Development programmes. Although most of these are State-owned, the water rate to be levied from such work is not covered by the provisions under the Madhya Pradesh Irrigation Act, and the concessional rates proposed are given below:—

I. Ex-Malguzari tanks (Irrigating more than 100 acres).—In these tanks it is found that the cultivators are accustomed to take less water per acre of crop than is provided in the State irrigation works. The proximity of the irrigable area to the headworks is also a factor which minimises consumption of water. It is considered desirable to continue the same standard of irrigation even after the tanks have been improved. Bringing these works at par with bigger works either in the matter of construction and maintenance standards or irrigation will create complications. In several tanks it is found that cultivators have acquired irrigation rights by usage in an area much larger than the tank would be capable of irrigating from the Irrigation Department's standard.

Water rate for this class of works is fixed at 75 per cent of the flow rates.

II. Ex-Malguzari Tanks (Irrigating less than 100 acres).—These tanks may either be repaired by Government or by local agencies, but will have to be maintained by the local bodies like the village panchayats. For these works also water rate and irrigation cess as above are recommended with the difference that the irrigation cess may be realised by the local bodies and credited to a Fund Account maintained solely for the purpose of maintenance of these tanks to enable the panchayats to meet the maintenance liability. The water rates in any case will be credited to the State revenue.

III. Grant-in-aid-works.—Under Community Development, Government have introduced an element of people's participation in irrigation works. Such works are executed on a grant-in-aid basis. The subsidy prescribed being 50 per cent subject to the condition that no water rate will be charged where the gram panchayat accepts the responsibility to maintain the works. Such works must vest with

panchayats or patel committee or village bodies. This system has not worked quite well, the majority of works repaired in this manner have not proved useful to the extent visualised. In such cases it is suggested that the cultivators be made to pay only the compulsory irrigation cess, as for the Ex-Malguzari tanks and the water rate waived off. The former could be realised by the local bodies and credited to a Fund Account maintained solely for these tanks. Such class of work must necessarily be under the category of tank irrigating less than 100 acres (40.5 ha).

IV. New Minor Irrigation Tanks (Irrespective of Size) constructed by Government.—Same rates as for canal water will be charged.

V. Minor irrigation works with permanently settled rates.—In the erstwhile Madhya Bharat, Vindhya Pradesh and Bhopal regions some irrigation schemes have been in existence for a long time. The area under command has been permanently assessed to enhanced land revenue known as 'Adan' or 'Abi' rates. In some cases the rates are as high as Rs. 10.00 per acre (Rs. 24.70 per ha.). The cultivators have to pay this whether irrigation facility is availed or not. When an old scheme is restored in such area, the land assessed to 'Adan' or 'Abi' rates should be exempted from the payment of water rates, if the 'Adan' or 'Abi' rate is higher than the water rates. If, however, the former is lower than the canal water rate, the cultivators should be asked to pay the difference, i.e., the 'Adan' or 'Abi' rate will be treated as rebate. This is the principle adopted for bringing wet land under agreement under the provisions of the C. P. Irrigation Act, 1931, now in force.

VI. Flood or Inundation Irrigation.—The rate for irrigation by flooding with or without any channel system may be kept the same as for ploughing, i.e., Rs. 2.00 per acre (Rs. 4.94 per ha.).

VII. Submerged Irrigation.—The water rate may be kept 75 per cent of the rates for flow irrigation.

VIII. Water Rates on works in 'Scheduled Areas' of Tribal District.—A rebate of 50 per cent in all rates should be applied in the first 10 years and the position be reviewed afterwards. This rebate should come from the Tribal Welfare Department to be credited to irrigation revenue.

IX. Irrigation from pick-up weirs.—75 per cent of the canal rates should be charged.

X. Irrigation by lift.—

(i) *Lift from flow canals, stop-dams and barrages.*—

(a) The canal water may be lifted by the cultivator at his own expense on payment of half the flow rates.

- (b) By animal or manual appliances.—Due to high cost of lift by this means, the rates should be 25 per cent of the canal rates.
- (ii) *Independent Lift Irrigation Schemes*—
- (a) By pumps owned and operated by Government.—The charges should be Re. 1.00 per fifteen thousand gallons.
- (b) By pumps owned and operated by private agencies.—No charges should be leviable but irrigators must obtain prior permission of the Department for pumping water from natural resources of water. Lift irrigation is costly and should not be introduced as a State enterprise on any appreciable scale. The local bodies and co-operatives should be encouraged to run the lift scheme installation themselves. Government sponsored schemes of this nature need to be restricted purely for demonstration and extension purposes.

XI. Irrigation partly by flow and partly by lifts.—As irrigation is not assured from certain small works and the cultivators have to do some watering by lift after one or two waterings by flow, 75 per cent of the normal rates should be charged in such cases.

Irrigation Cess

11.41 The irrigation cess is a small fee included in the water rate and is payable whether the irrigation facility created by the State is utilised or not. Every land holder under the irrigable command of a canal system shall pay this fee for the facility provided by the State of obtaining water for irrigation. The liability to pay this cess should not be dependent on the use or non-use of water. It is sufficient justification for imposing the cess as the opportunity to utilise water has been created, which did not exist before.

11.42 The utilisation of irrigation potential is of paramount importance as the delay not only retards the food production but locks up the capital which could have been utilised on other schemes. We shall now bring out the financial impact on the State revenues, due to delay in the utilisation of irrigation potential created.

Need for imposing compulsory irrigation cess.

11.43 Irrigation works in this State are mostly of the storage type. These works are more expensive than the diversion works constructed on perennial rivers. Since the benefit of such outlay on irrigation works goes to the selected few and at places where the works are constructed, it is reasonable to expect, that the cultivators receiving this favoured treatment should—(a) Necessarily utilise the facility provided. (b) So far as possible should not benefit themselves at the cost of the community as a whole.

11.44 We see from App. III-19 that under the flow irrigation works a potential for irrigation of 1,34,048 acres (54,279 ha.) under the Plan was created by the end of the year 1958-59. Out of this the utilisation was only in 60,005 acres (24,301 ha.), *viz.*, less than 50 per cent. It is very necessary that the full utilisation of potential created should be made so that the investment is not locked up without bringing any return. As these works have to be maintained whether the cultivator makes use of water or not, it is justified that the cost of repairs and maintenance is charged as a cess on compulsory basis.

Coverage of Irrigation cess.

11.45 While interviewing the witnesses we had elicited their opinion regarding the levy of this cess. Several witnesses agreed to the imposing of this levy in order to promote the use of irrigation works at all times and in different places. The other point for our consideration is whether the irrigation cess should be a fixed charge not liable to fluctuation with the change in prices.

11.46 We consider that although the working expenses are a function of the length of canal, distribution system and intensity of irrigation, this cess should be kept uniform for simplification. It should not vary from canal to canal and should be uniform for all the types of the crops irrigated.

Conclusion.

11.47 The compulsory irrigation cess shall be leviable on the entire irrigable area commanded (as defined under Section 10 of Central Provinces Irrigation Act, III, 1931) by the canal distributory or minor at the prescribed flat rate of Rs. 2.50 per acre (Rs. 6.17 per ha.). In case of small sub-merging tanks, ex-malguzari tanks regulators, pick-up-weir and Bandhars the rate will be Rs. 1.00 per acre (Rs. 2.47 per ha.).

11.48 The above rate is proposed on the basis of working charges for repairs and maintenance expenses normally incurred on irrigation projects. The cess shall be leviable whether irrigation is done or not. This levy will not be chargeable on water logged or salt affected areas till they are reclaimed. It will also not be chargeable on land declared as out of command under Section 8 of M. P. Irrigation Act. The cess would be made operative on the existing works also by suitable enactment.

11.49 We consider it very necessary to stabilise the revenues on our canals by giving a fair chance to the irrigators for using the canal supplies and not gambling on the meagre chances of getting timely rains. We are, therefore, of opinion that the rates of irrigation cess, under each class of work, should be such as to serve the above purpose.

CHAPTER XII

PART I—MEASURES TO IMPROVE EFFICIENCY OF IRRIGATION BEYOND OUTLET

12.1. Earlier we have observed that irrigation in the State is chiefly from storage reservoirs, which are quite costly. Especially in the paddy zone the canals run only for 3 months and are out of use for the remaining part of the year. The result is increased cost of maintenance per unit area irrigated. Since the water provided for irrigation is stored and conveyed at huge cost, it is essential to regulate its distribution judiciously and to economise its use at all stages of transit.

12.2. Irrigation of paddy in Chhattisgarh, is of supplementary nature. By and large the crop is sown here by broadcast method, although in the Jabalpur district, Machaua (broadcasting the germinated seed) is resorted to. Transplantation on large scale is practised in Balaghat district and in North in Gwalior, Bhind and Morena districts. The varieties grown are generally of the following types:—

- (1) Early maturing varieties, for which crop period is $3\frac{1}{2}$ months.
- (2) Medium varieties, *i.e.*, 4 months duration crop.
- (3) Late varieties, *i.e.*, $4\frac{1}{2}$ months duration crop.

For broadcast cultivation, no water is required for ploughing purposes. Further, no irrigation is needed till about one month after sowing. Water is then required for 'Biasi' operation which is usually done between the 3rd week of July to end of August, the daily requirement of water including rainfall being of the order of 0.5" (12.7mm). Normally the rainfall received is sufficient, but during short breaks supplemental irrigation is necessary. Later, in the months of September and October the water requirement of the crop gradually reduces. Since, the rainfall also decreases, irrigation is needed to meet the water deficiency. It is estimated that in a year of normal rainfall the shortage is 7.5" (190.5 mm) in September and 5" (127 mm) up to mid October (total shortage being 12.5" (317.5 mm)). The State irrigation works are in most years required to meet the requirement of 12.5" (317.5 mm) annually although in some years, the shortage may go upto 18" (457.2 mm).

12.3 For wheat crop, which is mainly grown under irrigated conditions in Gwalior area, the quantity of irrigation water required is dependent on rainfall in the latter part of monsoon (September and October) and in winter months (December and January.). If this is sufficient and well distributed the crop does not need any irrigation. As

this rarely occurs two irrigations of 3" depth each, are required for good yield. In order to effect proper irrigation of the crop, an estimate is made of the available quantity of water at the end of rainy season after which 'Ailan' is made specifying the total wheat area which can be irrigated.

Proposals for equitable distribution.

12.4 We were informed during our tours that there is great scramble for supplies for irrigation of paddy crop in years of deficient rainfall during the months of September and October. The canal outlets are not infrequently tampered with, thus upsetting the whole distribution system. Similarly, in the wheat growing districts, the demand for irrigation is very acute whenever the winter rains fail. In either case, the need for equitable distribution of available supplies is very great. Witnesses at many places brought to our notice instances of unequal distribution of irrigation water. Management of water in a large canal system is complicated and considerable experience and awareness on the part of the staff is necessary particularly when the supplies are to be issued during periods of long break. It is at the time of keen demand that the vigilance of the executive staff is called for. Good means of communication by roads and by telephones, help in exercising an effective control over the distribution of supplies. We recommend, that for the existing works and future constructions this should receive the attention of the department.

For proper distribution of Irrigation supplies we must ensure the following:—

- (a) The supply received at the head of each distributory or minor should be proportional to the demand.
- (b) Each outlet must receive its proper share of the available water in the distributory or the minor.
- (c) There should be equitable distribution of the supplies in the commanded area beyond the outlet.

The requirement as at (a) can be attained by correct appraisal of the demand by the departmental officers and regulation in the main canal and branch canals. In view of the great variations in soil texture and rainfall conditions, it is of the greatest importance to work out the water requirements for crops, by conducting field experiments and research. Experiments should also be conducted to find the evaporation and absorption losses in tanks and canals. For (b), it is necessary that the present pipe outlets which are frequently tampered with, are replaced by the pipe out-

lets with lockable flaps on the inlet side so that the following important functions of the outlet are satisfied:—

- (i) The outlet should be of permanent nature and incapable of being easily tampered with by cultivators.
- (ii) The discharge through the outlet should be independent of the upstream head which may be varying.
- (iii) The discharge of the outlet may not be changed by altering the depths in the water-course downstream.

Detailed examination of design of outlets, which would fulfil the above conditions is purely a technical matter and is outside the scope of this Committee. The Committee, however, strongly feels that suitable modular or semi-modular pipe-outlets, satisfying the basic needs, may be evolved by the Irrigation Department and fixed on all channels. Irrigation must be done through outlets only and not by cutting the banks, because in the latter case lot of water is wasted. It is needless to add that the cost of the outlet should, be as low as possible.

12.5. In order to accelerate and economise in the use of irrigation water, great stress is being laid, in all the irrigation programmes, on the necessity of constructions and maintenance of water courses. In several projects, the irrigation potential created at enormous cost has not been utilised partly because of the non-existence of the field channels. It is common knowledge that water for irrigation of distant and scattered fields sown with rabi or perennial crops cannot be supplied without field channels. As these channels are required to be constructed beyond the outlet to serve a group of fields in a chak, their construction and maintenance have necessarily to be done on community basis by the beneficiaries. In the wheat tract the cultivators construct water courses on their own for facility of irrigation. Generally these are neither suitably aligned nor graded to work to maximum efficiency. In the paddy area the present general practice is field to field irrigation. The necessity of construction of water courses in this area had till recently been a matter of controversy. No doubt, field to field irrigation in the past had its own merits, when irrigation was not developed and ample supplies were available. Due to rapid expansion of rice area under command of works and the supplies remaining constant, the problem of conservation of water, has assumed great importance. Wherever we discussed this matter with the public, it was impressed on us to devise ways and means for equitable distribution of supplies beyond the outlet in order to bring more areas under irrigation. On this subject of water courses we would like to reproduce an extract from a paper entitled "Construction of water courses and steps

necessary to ensure utilisation of Irrigation facilities"
 *read in the 6th Seminar, Irrigation, and Power, held at
 Hyderabad in 1959.—

"At present channels are constructed departmentally so as to deliver generally 1 to 1½ cusec from their tail ends and from the off-taking outlets. This discharge is capable of irrigating 100 to 150 acres. Cultivators are expected to construct water courses from these points generally along the borders of their fields to irrigate these block of areas. This involves a co-operative effort and mutual goodwill on their part. Hitherto the practice mostly has been to leave it to the cultivators to construct these water courses. They approach the Government for acquisition of land and construction of any such bit of water course where a recalcitrant cultivator refuses to co-operate. Irrigation Acts generally provide for meeting such contingency. In order, however, to accelerate the process of development of irrigation the desirability of getting these water courses constructed departmentally upto a block of about 25 acres with provision for recovery of cost from the cultivators in instalments is being actively considered by those interested in this problem.

(b) While examining this question it is important to consider that of the total losses of water through percolation during transit from canal head to field those in the water courses constitute about ha'f. Since this wastage reduces the capacity for irrigation and has to be kept to the minimum, the question of proper maintenance of the water-courses has to be given due thought. In each irrigation season the water course has to be cleared and its banks have to be made up frequently. With rains and cattle crossing, it gets damaged heavily. It, therefore, requires sustained efforts in repairs almost equivalent to a new construction in each irrigation season. Unless the cultivators get water course minded, they would not care to apply themselves to this work. It is, therefore, very essential to rouse water course consciousness amongst the cultivators and educate and persuade them to construct and maintain these themselves. Annual maintenance costs may be as heavy as initial construction.

(c) Simultaneously, with the construction of distributories and minors, the task of construction of water courses should also be undertaken. The necessary technical advice regarding layout, etc., should be provided by the Irrigation staff which is already

engaged on construction. Irrigation Panchayat should be set up in these areas and the assistance of Community Project Organisation should be secured to get the water courses constructed by the cultivators who are to be benefitted. Facilities should be provided for acquisition of land for construction of water courses where the cultivators refuse to make the land available for the purpose.

(d) In cases where the cultivators show complete apathy to the construction of the water courses, the work might be carried out by the Irrigation Department on the conditions that the cost could be recovered from the cultivators benefitted alongwith the irrigation rates, in instalments. Necessary provision in the Irrigation Act will have to be made for such recoveries. Even when such constructions have to be carried out departmentally inhabitants of the village concerned should first be given an opportunity to undertake the construction. Only when they fail to do so, the labour should be imported from outside. These water courses shall have a head discharge of not more than 1 to 1½ cusec”.

12.6 Under section 68-B (1) Water-Courses may be constructed where, in a chak not less than half a mile long or 80 acres in area the Provincial (State) Government considers it expedient to construct them. Also, under the provisions of section 75-B under Chapter VIII-A regarding construction and maintenance of field, channel, the Executive Engineer can order the permanent holders or occupiers of the irrigated area to construct field channels singly or jointly with other holders, for the proper distribution of supplies. The water-courses may be constructed by the cultivators on their own or under water-course contracts under section 66 of Irrigation Act. The construction of the field channels has to be done by the beneficieries themselves failing which the Executive Engineer would execute the works at their cost.

Present statutory rules for construction and maintenance of water courses and field channels.

Regarding the maintenance of the Water Courses|Field channels, it is the sole responsibility of the permanent holders or the occupiers, for whose benefits these channels are constructed.

12.7 We were informed during our tours that the existing water-courses are not of sufficient length and are not effective in equitably distributing the water in the full area of a chak. We consider that these channels should be extended to the size of block of about 10 times the average holding in the chak or 25 acres. Suitable cut-off points should be fixed and their positions recorded in a Register of water courses and colabas. These authorised cut-offs only should be used for diverting the supplies for

Suggestions for improvement of water-courses.

irrigation, under the control of Irrigation Panchayats. The water-courses should as far as possible, be aligned along the field boundaries to avoid intersection of fields. Experienced staff should be employed on the initial layout of these watercourses.

It would also be necessary to provide cheap type of masonry works including falls (rapids) and road, bridges, drainage, crossings to avoid recurring damage to these channels. It would be in the fitness of things if these masonry works are constructed under the direction of the Government. We have made this specific recommendation as we consider that from the practical point of view, this procedure will really benefit the cultivators for a long time.

Since the water-courses will have to be constructed by the villagers who are not conversant with the specifications of such works, it is suggested that the banks should be strengthened by encouraging growth of 'doob' grass. This would give stability to the bank and would prevent their washing away due to standing water in nearby paddy fields. It would also render its cutting difficult for doing unauthorised irrigation.

12.8 From the foregoing paragraphs it is clear that the distribution of water is an intricate problem, which the Sectional Officer and Sub-Divisional Officer, Irrigation, have to face. The complications are many and only efficient co-operation of cultivators can solve it in a satisfactory manner. In Mahakoshal region, system of distribution of water under supervisory control of Irrigation Panchayats has been in vogue since a long time and has considerably helped to systematise distribution of supplies. During our enquiries, we found that the opinion of cultivators was divided in the matter of entrusting this distribution to Irrigation Panchayats. Some favoured the continuance of existing system of Irrigation Panchayat as in Mahakoshal area, while others considered that the duties of Irrigation Panchayat in respect of distribution of water could be conveniently entrusted to Gram Panchayat. We have carefully considered the conflicting views of cultivators and are of the opinion that Irrigation Panchayats should be constituted in all irrigated villages. It is also our view that separate Panchayats should be constituted for large distributories, so that the villages served receive equitable supplies. It is necessary that members of Irrigation Panchayats and distributory panchayats should be irrigators. In order to efficiently discharge their duties, these Panchayats should be assisted by 'Banihar' (labourer).

PART II—MEASURES TO POPULARISE IRRIGATION AMONGST AGRICULTURISTS

12.9 During our contact with the public, it was pointed out to us that Government should adopt such measures

Distribution of
supplies and
supervision.

which would popularising irrigation amongst cultivators and thus ensure quick returns of revenue from the works. The following suggestions are made in this regard.

12.10 For changing over to wet farming, heavy initial investment is needed. The land has to be prepared by grading and bunding. Funds are required to purchase manure, chemical fertilisers and proper quality of seed. For all these reasons, Government should make available cheap credit in the form of loans with or without subsidy payable over a long number of years at a nominal rate of interest. For preparation of land, suitable farm implements should be made available. The Technical Co-operation Mission have recommended a number of implements to suit the particular topographical needs of this State. Their use could be popularised by proper demonstration.

Cheap credit loans for land preparation fertilisers seed, etc.

12.11 The use of irrigation water is delayed for want of field channels. We have already laid great stress on this point in the earlier part of this chapter and have also suggested measures to ensure their speedy construction.

Construction of field channels.

12.12. Adoption of improved agricultural practices and taking to suitable crop pattern in the irrigated areas is also very essential. In this, the agricultural extension activities under the Community Development Programme could play a very significant role. Government have already laid down a policy that the areas under command of new irrigation works are to be given preference to other areas for opening of new Community Development Blocks. Under the auspices of this programme, demonstration plots could be set up and crops suitable for best out turns could be grown. These demonstration farms would go a long way in introducing and popularising the type of crop planned to be grown under a particular irrigation project.

Agricultural extension activities under Community Development.

12.13 Increased production in its wake creates a few more problems which should also be satisfactorily solved. There should be proper warehousing and marketing facilities, because, if the cultivator has to sell his produce at uneconomical rates, he would not be attracted to grow irrigated crops.

Warehousing and Marketing facility.

12.14. Land reforms can go a longway to speed up irrigation development. The sub-division and fragmentation of land holding are factors which retard extension of irrigation. Suitable measures are already afoot to consolidate the holdings. As and when these holdings become of economic size, irrigated cultivation will become more and more paying to the farmers.

Consolidation of holdings.

12.15 In tribal and backward areas the cultivators are not accustomed to irrigation and are not willing to pay high rates, the Committee feels that concessional water rates

Sliding scale of water rates.

should be charged for the first two years of completion of a project. We recommend the following for food crops only:--

	Rice	Wheat
1st year	Free	Free
2nd year	Half	Half rate
3rd year	Full	Full rate

No concession is proposed for cash crops, viz., cotton, sugarcane, Orchards, etc.

Price support
policy.

12.16. On account of the rising cost of cultivation, the cultivator should be assured of a reasonable price of agricultural produce; unless this is done he would not be easily attracted to invest on improved agricultural practices. We, therefore, recommend that the Government should actively pursue the price support policy. In places where the irrigation canals run through the hitherto uncultivated land (just as the Chambal Canal) we recommend, that Government should colonise such areas, as has been successfully done under the Bikaner canals of Rajasthan.

Development Com-
mittees for utilisation
of irrigation water.

12.17 Development Committees have been formed at various levels, starting from Tahsil level to State level [see Appendix III-19 (a)].

We consider that the working of these Committees will go a long way in securing the desired results of development of irrigation and popularise it amongst the cultivators. We propose that some representatives of the public should also be nominated in the Committees at different levels so that the decision of the Committees may be readily accepted by the cultivators.

PART III.—SCOPE OF AGREEMENT AND DEMAND SYSTEMS

Various systems of
assessment of water
rates.

12.18. The more important systems of levying water charges in this State may be grouped under the following heads:—

- (1) Volumetric rate, i.e., a charge according to the quantity of water delivered.
- (2) Consolidated rate, i.e., water charge which is consolidated with the land revenue assessment and fixed on the settlement principle.
- (3) Occupier's rate, i.e., a fixed rate charged on the area actually irrigated and which usually varies with the nature of crop or crops.
- (4) Agreement rate, i.e., a charge based very much on the same lines as in (3) above, but which is fixed by agreement for a period of years and paid for, whether water is taken or not.

In this State, irrigation done and charged for at 'Occupier's rate' as defined above, is called irrigation on 'Demand' in Mahakoshal and irrigation under one-year agreement ('Ailan' system) in Madhya Bharat, while the irrigation done at agreement rates is for a long-term, *viz.*, ten years, which is now reduced to 5 years. The agreement system is only in force in Mahakoshal region. In Bhopal and Vindhya Pradesh regions, irrigation water is supplied on demand. It is our aim in this chapter to critically analyse the two systems and examine their suitability.

12.19. The principle of irrigation in most of the States in India is 'no water, no charge'. In the States where the rainfall conditions for growth of a crop are normally favourable, long-term leases of water at comparatively low rates are entered into by the Government with the permanent holders of land. This system is prevalent in deltaic tract of Orissa, West Bengal, Bihar and in Mahakoshal region of Madhya Pradesh, and for sugarcane irrigation in Bombay State (*See details in Appendix III-16*). Incidence of irrigation under agreement in different States.

12.20. In Mahakoshal region the first works constructed were at a time when irrigation was not in constant demand. Prior to 1906-07, rates for each watering were in force. Government having realised that with this system of irrigation on demand cultivators did not make full use of supplies available with the result that the yield of crop suffered. It was decided then to introduce the levy of crop rates. A year later, *viz.*, 1907-08, a new system was introduced in Chhattisgarh under which malguzars entered into contracts before June and agreed to pay a rate of As. 8 per acre on all the commanded rice area in their village whether they required water or not. Alternatively they could get water on demand at Rs. 1-4-0 per acre. As a matter of coincidence the contract system was introduced in a year when there was keen demand and it was a great success. This system was the fore-runner of the present agreement system. History of irrigation agreement in Mahakoshal.

During the next decade, one-year agreement system continued. This matter was discussed at a series of conferences of revenue and irrigation officers in 1916 with special reference to Chhattisgarh. The long-term agreement was introduced in the year 1918-19. This system was generally to the advantage of the cultivator and it provided a remedy against the evils of procrastination in the demand for water. It also simplified distribution and rendered assessment, a very much easier matter than it would be otherwise. In order to encourage the cultivators to enter into agreement, very substantial concessions were made in regard to rates. The actual terms offered varied in different parts of the province, but generally water was given free in the first year, and during the remainder of the period of agreement the rate increased gradually until it reached a maximum of Rs. 3 in Chhattisgarh and the north of the province, Rs. 3-8-0 in Bhandara and Balaghat, and

Rs. 4 in Chanda. The demand rate was fixed at a figure appreciably in excess of the maximum of the agreement scale, the object being to encourage the cultivators to enter into agreement and to discourage irrigation on demand which, it was realised, could never be adopted as the standard practice.

The long term agreement is drawn for rice or wheat crop and is binding for a number of years (5 to 10 years). Owing to limitation of supplies, agreements for sugarcane crop are not made. It is accepted by Government if holders of not less than 2/3rd of or not less than 95 per cent of the permanent holders of all the irrigable land in the village, mahal or chak cultivated with crops, have given their consent for the proposed irrigation agreement. Within the period of the agreement, it is obligatory on the cultivators to pay fixed rates settled at the time of agreement, whether water is used or not. The Government is thus assured of fixed revenue available for meeting the operation and maintenance charges. A voluntary system of intermittent demand for irrigation water would not only result in the wide fluctuation in the irrigation revenues from year to year but would also cause large quantities of irrigation water to remain unutilized in years of normal rainfall. The cultivators may not have adequate incentive for growing the proper variety of irrigated crops which would seriously retard the production programme.

Why agreement is not suitable in wheat zone.

12.21. The general reasons for advocating the agreement system in the wheat zone are similar to those prevailing in Mahakoshal region. The cultivators in the past used to wait and see the clouds before entering into agreement although due to these delays their crops suffered. In order to assess whether such conditions prevail in the Madhya Bharat region, the statistical data regarding (i) storage available in Harsi-cum-Kaketo at the end of monsoon; (ii) the winter rainfall; and (iii) the actual area irrigated under rabi and kharif were studied. It is clearly seen that wheat irrigation is very popular under this system, and the demand is keen from year to year. Whatever storage is available is not only fully utilised but there is always a demand for more water. Although the winter rains help the wheat crop, it cannot be said that there has been any tendency on the part of the cultivators to delay their demand.

12.22. We have studied the working of the Harsi canal system from the year 1951-52 to-date. During these 9 years the tank did not fill completely during the years 1951-52, 1953-54 and 1954-55. The result was that during the year 1953-54, only 22, 300 acres of rabi could be irrigated against the present year's figure of 53,000 acres. Similarly, the irrigation of sugarcane suffered and fell to 1/5th of the normal area irrigated annually. The same record also shows that comparatively large area of paddy was irrigated in the year. The consequences of drawing

agreements for paddy or rabi or both would be that in years of poor rainfall, the irrigation of paddy may be done preferably by the cultivators at the cost of the following crop of rabi which is not at all desirable, as wheat is the staple food crop in these districts. Similarly, rapid fall of sugarcane irrigation would arise which would have repercussions on the working of sugar factory already established at Dabra.

12.23. Large canal systems in the State (except for the Chambal and Tawa, which are the multi-purpose river valley projects), draw their supplies, from streams, which have very small flow in dry weather and are not dependable for irrigation of perennial crops. The governing condition, of dependable storage being not satisfied, we do not recommend the adoption of the agreement system for any crop irrigated in Madhya Bharat. Some of the witnesses from Madhya Bharat expressed their views in favour of long-term agreement as the years of satisfactory winter rains, irrigation is not in demand in Madhya Bharat and revenue falls and also the agreement system ensures correct recording of assessable area for a long-term. We have weighed the arguments and consider that with the introduction of compulsory irrigation cess, sufficient inducement is created and cultivators would not gamble on the chances of rainfall. The recording of correct areas, can be ensured by prescribing checking by higher Officers.

PART IV.—ASSESSMENT AND COLLECTION OF IRRIGATION REVENUE

12.24. The system of assessment of irrigation revenue and its collection are different in Mahakoshal from that in Madhya Bharat, Bhopal, and Vindhya Pradesh. The revenue establishment in Madhya Bharat consists of (1) Superintendent, Abiyana; (2) Jiledar; (3) Naib Tahsildar (Irrigation); (4) Amin; and (5) Patrol. The patrol makes the initial entries in the khasra shudkar. His duties are analogous to that of a revenue patwari. His work is checked by the amin whose main function is to do the girdawari, prepare jamabandi and parchas as per entries in the shudkar. Naib Tahsildar is subordinate to the Ziledar. His principal duties are, to make village-wise allocation of areas declared under 'Ailan' by the Executive Engineer, He is responsible for recording of irrigation by the patrol and amin and also for collection of revenue in his jurisdiction. He investigates cases of unauthorized irrigation and remission and submits the report to the Executive Engineer, The Ziledar is the reserve head of Abiyana in the division and is responsible for correctness of all such records and full realisation of irrigation revenue. The Assistant Abiyana is subordinate to the Superintending Engineer, and is responsible for checking revenue receipts of the circle. In the Mahakoshal, irrigation is done mainly for single crop of paddy. Here the revenue establishment is (1) Canal Deputy Collector; (2) Irrigation Inspector; and (3) Amin.

System in Mahakoshal.

12.25. The irrigation of paddy is generally done under A-I Form of agreement which greatly simplified the assessment of irrigated area. By this system which is binding for five to ten years, the areas to be assessed are fixed by Girdawari done by the sectional officers and Irrigation Inspectors, prior to the drawing of the agreement. The water charges on the fixed areas are leviable during the currency of the agreement whether water is taken or not, no charge on additional area brought under irrigation.

The collection of water rates is initially done by the irrigation panchayat up to fixed date according to the demand statement (Jamabandi) prepared by Canal Deputy Collector. Later, the arrears are recovered as that of land revenue by the Canal Deputy Collector by issue of warrants.

Conclusion.

12.26. The irrigation in the State is done mostly for the single crop of rice in Mahakoshal, wheat in Bhopal and for mixed crops in Madhya Bharat and Vindhya Pradesh. The systems of assessment for kharif crop (irrigated under long-term agreement) and rabi crop (irrigated on demand or short-term one year agreement) must necessarily be different as the former system does away with the need of annual checking of areas. Since both the systems mentioned above have been well established and are adequate they have been recommended for the sake of uniformity all-over the State by suitable amendment in the Madhya Pradesh Irrigation Act, 1931.

Collection system

12.27 The collection of irrigation revenue should in all cases be done through the agency of Irrigation Sub-Committee constituted under the Gram Panchayat. The present system of assessment and collection of revenue in Madhya Bharat is given at Appendix III-19 (c). Duties of Irrigation Panchayat is given at appendix III-19(b).

CHAPTER XIII.—IRRIGATION, HYDRO-POWER AND INDUSTRIAL RESOURCES OF MADHYA PRADESH, AND THEIR LONG-TERM DEVELOPMENT.

13.1. Madhya Pradesh lies mainly on the table-land of Central India and is the water shed of a large number of rivers, that flow out of the State in all directions feeding the Yamuna and the Ganga in the North, the Narmada, Tapti and Mahi flowing westward to the Arabian sea, the Mahanadi and the tributaries of the Godavari draining the South-Eastern portion of the State towards the Bay of Bengal. On the North, it is bounded by the upper Gangetic Valley in Uttar Pradesh. The arid tracts of Rajasthan lie in the North-West, while the Orissa and Gujarat States are situated on the East and West respectively. On the South, the State is bordered by Maharashtra and Andhra Pradesh.

13.2. The State's river water resources for a normal year of rainfall have been computed at 143 million acre feet its basinwise distribution being as under :—

Table ††

S. No. and River Basin	Tributaries	Drainage area in Madhya Pradesh (Sq. miles)	Normal annual run off (M.A.ft.)
(1)	(2)	(3)	(4)
1. Yamuna	Chambal, Sindh, Betwa and Ken.	53,000	36.0
2. Ganga	Tons and Son	23,000	21.5
3. Narmada	Banjar, Hiran, Sher, Shaker, Sitaresa, Tawa, Chhota Tawa.	34,000	33.0
4. Mahanadi	Shconath, Arpa, Pairi, Jonk, Hasdeo and Mand.	32,000	23.0
5. Godavari	Wainganga, Indravati, Sabri	24,000	27.0
6. Other Basins (Tapti & Mahi).	..	5,000	2.5
	Total..	1,71,000	143.0

††Source—Interim report of the State working group on irrigation August, 1960.

13.3. The total area irrigated from all sources in the State prior to first Plan was about 22 lakh acres. The percentage of irrigated to sown area was 6.3 per cent, while the utilisation of surface runoff being just 3 per cent.

A potential of 6.97 lakh acres has since been added under Major, Medium and Minor Irrigation works (including those under Agriculture Department) completed in the First and Second Plans. It is proposed to bring under irrigation, an additional area of about 15 lakh acres in the

Further Programme of Irrigation Development.

3rd Plan, which will raise the total irrigation in the State to about 44 lakh acres. An irrigation intensity of 11% is therefore expected by the end of 3rd Plan, which will still be far below the country's present average of 20%.

13.4. The above leeway shows the extent to which the State has yet to travel before it reaches the level of 50 per cent intensity of irrigation development, as envisaged by the country.

13.5. The State Working Group on irrigation, has recently examined the question of formulating tentative programme of irrigation development over a time perspective of 10 years (Third and Fourth Plan). They have suggested that the State should strive to realise an irrigation intensity of 20 per cent by the end of Fourth Plan. Emphasising the need for stepping up the present tempo, the Group has recommended that the State's Third and Fourth Plans should be so formulated as to assure irrigation facilities in an area of 8.0 million acres by 1970-71. Other States are going ahead at a much faster pace. The gap between them and this State is widening instead of narrowing down and we are being left behind in the race for catching up with the all-India average. We are informed that the working Group has been asked to study the physical possibilities of irrigation schemes in the State with a view to assessing the ultimate irrigation potential of various river basins. In their interim report submitted to Government in August 1960, they have tentatively estimated the State's irrigation potential as 20 million acres. The report further adds: "While the extent to which the annual runoff would be utilised depends on the topography of the basins, their flow characteristics, storage possibilities and a number of other factors a tentative assessment of the irrigation potential has been attempted on the basis of land (irrigable) available and its co-relation with runoff available upstream. Unfortunately, the coverage of basic topographical maps (1"=1 mile) is not sufficient in certain parts of the State and therefore recourse had to be taken to 1"=2 miles or 1"=4 miles, Survey of India maps, for roughly marking the commanded areas and the project sites. The culturable commanded area has been generally assumed as 70 per cent of the gross commanded area and the irrigable areas as 70 per cent of the culturable commanded area.

Ultimate Irrigation
Hydro-Power Potential,

13.6. The following table shows the present utilisation, utilisable runoff and irrigable area in each basin as worked out by the Working Group:—

Table

S. No. and River Basin (1)	Present Utili- sation (M.A.ft) (2)	Utilisable runoff (M.A.ft.)			Irrigable area (Million acre) (6)
		Irriga- tion (3)	Other uses (4)	Total (5)	
1. Yamuna	1.0	16.0	3.0	19.0	7.4
2. Ganga — —	Neg.	4.5	9.0	9.0	2.0

	(1)	(2)	(3)	(4)	(5)	(6)
3. Narmada	0.4	9.0	3.0	12.0	4.0	
4. Mahanadi	2.1	9.5	2.5	12.0	4.0	
5. Godavari	0.7	4.5	4.5	9.0	1.5	
6. Tapi and Mahi	Neg.	1.0	4.0	1.4	0.7	
Total	4.2	45.5	17.9	62.4	20.0	

Note.—Neg. denotes quantity less than 0.1 M. A. ft.

13.7 The working Group has estimated the present utilisation of surface runoff as about 3 per cent of the total flow and 7 per cent of the utilisable runoff. The three Major river basins viz., Mahanadi, Narmada and Yamuna possess more than three-fourth of the State's irrigation potential. Yet, they respectively utilise at present hardly 7 per cent, 1 per cent and 3 per cent of the surface water resources. The two multipurpose projects of the second plan viz., Chambal and Tawa are located in Yamuna and Narmada basins respectively. Mahanadi basin too had a fair share of irrigation projects in the Second Plan. The other major basins on which adequate attention has not been paid so far and which have considerable unexploited water wealth in their rivers are the Godavari 97 per cent and the Ganga 99 per cent. Mahi and Tapi are minor basins possessing less than one per cent of the State's total irrigation potential. Almost the entire water resources of these two basins are at present unutilised.

13.8. At the end of March 1958, the total installed capacity of Public Electricity supply undertakings in Madhya Pradesh was about 92,000 kw. i.e., 2.85 per cent of the total installed capacity in India. Of this aggregate capacity, about 80 per cent was accounted for by steam station and the remaining 20 per cent by diesel stations, the hydro-power capacity being nil. The only other State without any hydro-power station was Rajasthan.

13.9. The known Hydro-power sources of Madhya Pradesh rivers aggregate to about 4 million kw. and are located mainly in the Godavari and Narmada basins. There are no existing Hydro-Power Stations in the State, the first stage of Chambal Project, viz., Gandhisagar Dam with an installed capacity of 92,000 kw. has only recently been commissioned. The Rana Pratap Sagar, the Second stage of Chambal Project and the Tawa Multipurpose Scheme in the Narmada Basin will be implemented in the third Plan period. Further, it is proposed to initiate the construction of Hasdeo and Punasa Dams in the fourth Plan period. By the year 1970-71 plan, with the implementation of Chambal, Tawa, Hasdeo and Punasa Projects the total installed capacity of Hydro-power stations in the State will

rise to about 5 lakh kw. i.e., 12 per cent of the total potential of the State, which will still leave considerable room for hydro-power generation in the State.

13.10. The National Council of Applied Economic Research in their report on the Techno-economic survey of Madhya Pradesh have divided the State into four regions on the basis of future hydro-power development. The relevant extract is reproduced below:—

“Western Region.—This region comprises area around Ujjain, Indore, Bhopal, Khandwa, Itarsi, etc. The Chambal Power Station would be the main source of hydro-power. Its potential being limited, major power development must be based on the large potential of the Narmada. The Punasa Project will have to be constructed first, since it provides the main source of regulation of the flow of the Narmada without which the down stream sites can not be developed.

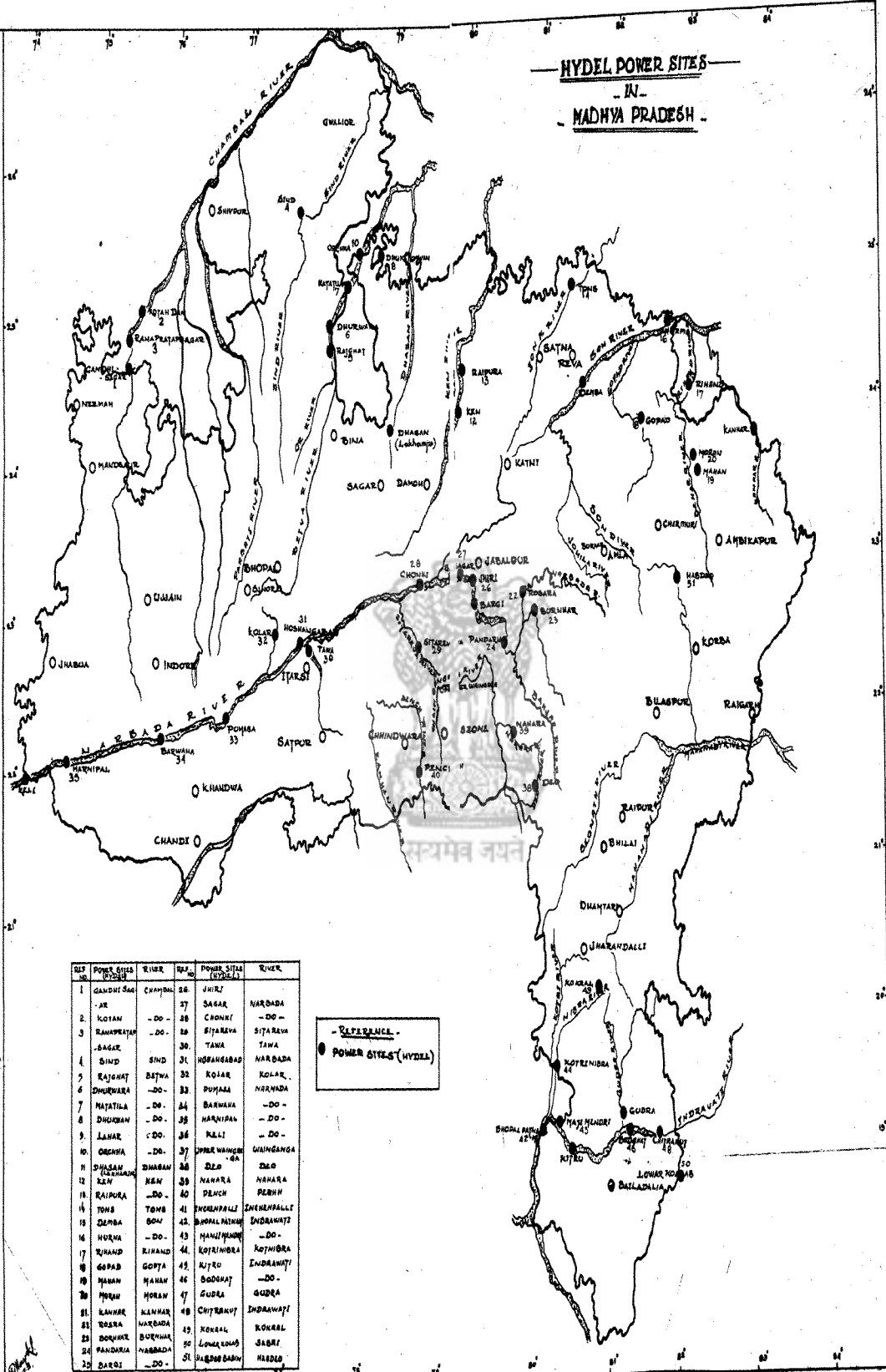
Southern Region.—This area comprises mainly the Baster district. For initial development, the possibilities are the Lower Kolab site and the Chitrakot scheme. The larger schemes of the Indravati can be expected to follow after demands for power come within the range of their outputs. Power could also be imported to this area from the neighbouring Sileru Project in Andhra Pradesh now in early stages of implementation, with a potential of the order of 8,00,000 kw. at 60 per cent L. F. capable of development in easy, economical stages.

North Region.—On the North-Western side further stages of the Chambal Project viz., Ranapratap Sagar and the Kotah Dam Power Station will provide a total of over 2,00,000 kw. at 60 per cent L. F. Hydro-power for the northern most part of the State can be drawn from Betwa Basin, where the Matatila Multipurpose project has been constructed by Uttar Pradesh. The Betwa would have to be developed jointly by Madhya Pradesh and Uttar Pradesh States and since Matatila Project does not amply regulate the flow of the Betwa, storage reservoir would first have to be constructed in Madhya Pradesh before the lower reaches of the river can be economically developed. The Rajghat Dam Project which would also substantially increase the potential at Matatila Dam would, therefore, claim high priority.

For the northern area around Rewa, Satna, Panna, Katni, etc., the Tons projects constitutes an attractive source with a natural head of the order of 600 ft. and civil works capable of rapid construction. The Tons scheme may be followed in turn by schemes on the Ken and the Son. To a certain extent the North-eastern part of the State can also obtain hydro-power from the Rihand Project under agreement

HYDEL POWER SITES

- IN -
MADHYA PRADESH



SER	POWER SITES	RIVER	SER	POWER SITES	RIVER
1	GANDHI SAGAR	CHAMBAL	26	JHURI	NARABADA
2	KOTAN	- DO -	27	SAGAR	- DO -
3	RAMAPETAPARABADI	- DO -	28	CHONKE	SITARAVA
4	SAGAR	- DO -	29	SITARAVA	TANA
5	SIND	SIND	30	TANA	NARBADA
6	RAJASHT	BEJWA	31	HORANGABAD	KOLAR
7	DHURUWA	- DO -	32	KOLAR	NARADA
8	MATATILA	- DO -	33	PUMBA	- DO -
9	DHURUWA	- DO -	34	BARWAHA	- DO -
10	JANAR	- DO -	35	HARNIPAN	- DO -
11	ORANGA	- DO -	36	KALI	- DO -
12	DHARAN	- DO -	37	UPPER NARMADA	USHINGANGA
13	DHARAN	- DO -	38	DEO	DEO
14	RAIPURA	- DO -	39	NAHARA	NAHARA
15	TONG	BOM	40	PENCH	PENH
16	DUMBA	- DO -	41	INDRANATHI	INDRANATHI
17	KURNA	- DO -	42	INDRANATHI	- DO -
18	RIKAND	RIKAND	43	KOTIMBIRA	KOTIMBIRA
19	GOPAD	GOPAD	44	INDRANATHI	- DO -
20	MARAN	MARAN	45	GURDA	GURDA
21	MORAN	MORAN	46	CHITRAVATI	CHITRAVATI
22	KANWAR	KANWAR	47	KOKRAL	KOKRAL
23	DOHUR	DOHUR	48	SABRI	SABRI
24	PANDURIA	PANDURIA	49	NARABADA	NARABADA
25	SABRI	- DO -	50	NARABADA	NARABADA
			51	NARABADA	NARABADA

REFERENCE -
POWER SITES (HYDEL)

with Uttar Pradesh. For the Eastern most region the Hasdeo Multipurpose Project located close to Korba station is of immediate importance.

Central Region.—In the Central region the main hydro sources of immediate interest are the small schemes in the upper most reaches of the Narmada basin. Here the proposed Bargi multipurpose project would conceivably be taken up for both irrigation and power. The Tawa, the Sitara and few small schemes are also under consideration. The bulk of requirement of this region in the near future may have to be drawn from thermal stations.

The names and potentials of various hydro-electric projects are given in Appendix III-20 and their location shown in map in Appendix II-6.

13.11. The above description gives a broad out-line of the great potentiality of hydro-power development in Madhya Pradesh. We recommend that all these projects should be linked up with irrigation development and as such would require detailed investigation and a good deal of planning before they are executed. Besides the big or medium sized hydro-power projects, there are possibilities also of micro hydel schemes for which natural sites are available on the tributaries of the principal rivers. Building materials are also available nearby.

13.12 A number of hydel projects have recently been constructed on inter-State rivers by adjacent States viz., Matatila and Rihand by Uttar Pradesh, Hirakud by Orissa and Machkund by Andhra Pradesh. In the case of Rihand Project 90 per cent of the catchment and 26 per cent of submergence lies in this State while under Matatila reservoir 17,800 acres of land belonging to Madhya Pradesh has been submerged. The Gangau Dam and Rangawan Feeder Reservoir were constructed within the Vindhya Pradesh region of this State, although the entire supplies are utilised under Ken canal in Uttar Pradesh. Substantial hydro-power potential of the State is concentrated in the border areas and there is a keen demand from the neighbouring States for the utilisation of this power. A number of sites of hydro-electric projects within or on the border of Madhya Pradesh are at present being investigated by the adjoining States. These are Kolab by Orissa, Ken and Raighat by Uttar Pradesh, Nawagaon by Gujrat and Nawtha by Maharashtra. All these projects will benefit in so far as irrigation is concerned mainly in the neighbouring States. All such and similar cases that may crop up in future demand vigilance on the part of Madhya Pradesh Government with a view to taking adequate steps well in advance to evolve schemes that may be equitable to this and the neighbouring States. A phased programme of investigation of hydro-electric schemes, keeping in view their multipurpose development wherever, the same is

feasible, should be immediately drawn up. This would require the creation of a full-fledged Investigation and Planning Organisation in the State.

Industrial Potential and Water requirement.

13.13. The Industrial structure of Madhya Pradesh lacks diversification. The textiles are dominant industry, while metal-based and chemical industries are in a rudimentary state. With the establishment of Bhilai Steel and Bhopal Heavy Electrical Plants, however, there will be a material change in the State's industrial structure.

Resource based industries offer the best scope for bringing about industrial development of the State. But to realise the development, the existing principal deficiencies in the overheads *e.g.*, power, water supply and transport have to be overcome. After considering the availability of raw material, demand and locational advantage, the National Council of Applied Economic Research in their report on Techno-Economic Survey of Madhya Pradesh have indicated the following Major development of mineral based industries in the State during the period 1961—71:—

- (i) An additional cement capacity of the order of 1.5 million tons a year, spread more or less evenly during the ten years.
- (ii) An additional capacity of 2,50,000 tons a year in the refractories industry, subject to quality of clays being found suitable.
- (iii) A plant for low temperature carbonisation of coal with an initial capacity of 200,000 tons a year, to be expanded to 6,00,000 tons by 1971.
- (iv) A Nitro-chalk Plant with capacity to produce initially 70,000 tons of Nitrogen, during the third Five-Year Plan.
- (v) A calcium carbide plant with a capacity of 10,000 tons a year.
- (vi) Additional Steel capacity of 3 million tons 1.5 through Bhilai expansion, and the remainder from a new plant.
- (vii) A plant or plants to produce 60,000 tons of alumina per year additional capacity if there is demand for alumina from other parts of the country.
- (viii) Plants for smelting 30,000 tons of aluminium metal per annum by 1971. Capacity of about 10,000 tons can be established during the Third Plan and the remainder in the Fourth.
- (ix) A plant for beneficiation of manganese ore can be considered for the Third Plan.
- (x) A ferromanganese plant capacity 50,000 tons a year during the Third Plan.
- (xi) A plant for producing 3,500 tons of precipitated chalk during the Third Plan.

In addition to above, there are possibilities of metal based or secondary industries e.g., metal fabrications, cement pipes, Super Phosphate, sulphuric acid, glass ware etc.

13.14. Suitable sites for major industries have been located round about Bhilai, Bilaspur, Anuppur, Jabalpur, Itarsi, Indore, Ujjain and Ratlam. As the success of any industry depends upon reliable and cheap source of water supply, we suggest that the Irrigation Department should have plans ready for meeting the requirement of these industries and also those proposed in future. It has been observed that water stored and supplied for industrial purpose gives five times the return as compared to its use for irrigation. The development plans of the State under irrigation sector, therefore should make a calculated provision for industrial water supply also wherever the same appears feasible.

13.15 We have seen that the ultimate irrigation potential capable of development is of the order of 20 million acres. At the present pace of development it is estimated that by the end of third Plan the unexploited potential will still be 15.6 million acres. On the hydro-power side, of the total potential of 4 million kw. only about one lakh kw. will have been developed by 1965-66. The lag in the power side, therefore appears considerably more than that on the irrigation side. Fortunately the hydro-power resources are fairly well distributed in nearly all the regions of the State. Looking to the long term economy of hydro-power generation and to the possibility of combining a hydel scheme with other aspects of river basin development viz. irrigation, navigation, flood control etc. we consider that greater stress is now called for on the coordinated efforts of Irrigation Department and the Madhya Pradesh Electricity Board towards formulation of integrated river valley schemes. On a rough estimate, the development of 4 million K. W. of power at 60% load factor will require a regulated discharge of 1.10 lakh cusecs (assumed for an average head of 300 feet.). It is estimated that 50 per cent of this discharge can be utilised for irrigation and industrial uses in the State, which will suffice to irrigate 5.6 million acres of kharif and 2.8 million acres of rabi crops totalling to 8.4 million acres, and very nearly meeting the full demand of industries.

Co-relation of Irrigation and Hydro-power project.

13.16. In the context of the heavy programme of development envisaged in the preceeding paragraphs, we consider that in the State there is a dire necessity of preparing a Master Plan of water resources development. The Chief Engineer, Irrigation, at the instance of State working Group of which he is the convenor has already moved the State Government in this regard. We fully concur with the views offered by him in his letter of September 23, 1959.

(copy enclosed Appendix III-21), but would suggest that the Planning and Investigation cell that he has suggested should comprise a full circle charge held by one Superintending Engineer, four Executive Engineers, 16 Assistant Engineers with necessary field and ministerial staff.



CHAPTER XIV—SUMMARY OF MAIN RECOMMENDATIONS AND CONCLUSIONS

14.1. Due to varying conditions of topography, rainfall and soils, uniform water rate structure for the whole State is not considered feasible and is not recommended (paras 11.24 and 11.25).

14.2. The basis for fixing water rates should be the additional net benefit due to irrigation limited by the capacity to pay (paras 11.28, 11.30 and 11.36).

14.3. The Committee concur with the principle of levying a betterment tax as already enacted. They, however, recommend that the quantum of this levy should be 50 per cent of the difference in land value between irrigated and dry land at the time of completion of a project and need not be correlated with the capital cost of work as is the practice to day (paras 11.4, 11.7 and 11.8).

14.4. The amount of betterment levy, which works out to Rs. 140 per acre on the above principle, should be payable either in a single instalment or in two series of instalments of Rs. 8.00 for 5 years and Rs. 12.00 for next 15 years. The betterment levy will be payable from the third year of water being made available for irrigation and could also be payable in the form of land (para 11.11).

14.5 A compulsory levy, to be known as irrigation, cess should be charged on the entire area within irrigable command of work. Except for small irrigation works like regulators, bandharas, ex-malguzari tanks where irrigation is not secure, the irrigation cess should be Rs. 2.50 per acre. For small works, rate of Re. 1 per acre is recommended. The irrigation cess should be levied on all pre-plan works also (para 11.4).

14.6. The following water rates have been recommended :—

A. Rice Zone :—

- (i) Paddy—Rs. 8.00 per acre (for long term agreement).
- (ii) Wheat—Rs. 4.00 per acre (for one year agreement).

B. For wheat and mixed crop zone :—

- (i) Paddy—Rs. 10.00 per acre (one year agreement).
- (ii) Wheat—Rs. 7.50 per acre (one year agreement). (paras 11.28 and 11.30).

C. The water rate for second crop in the same field should be half the rates fixed for it when irrigated alone. This is to encourage double cropping in irrigated areas (para 11.39).

D. No water rates for 'Utera' crop in Chhattisgarh and 'Nami Dhan' in Gwalior should be charged.

E. For sugarcane the rate should be Rs. 20.00 per acre for a year for full irrigation and Rs. 12.00 per acre for sparse irrigation. The period of irrigation should be fixed having in view the local condition of the area in question. (para 11.38).

F. For lift irrigation the charge should be on volumetric basis at the rate of Re. 1 per 15,000 gallons. For lifting canal water by cultivators at their own expense, the charge should be $\frac{1}{4}$ th of the normal flow rates, (para 11.39), if lifting is done by animal or manual labour and half the flow rates if lifting is done by mechanical pumps.

G. For flood irrigation by regulators, the rate should be Rs. 2 per acre (para 11.40 (vi)).

H. Water supply for industrial and non-agricultural purposes, should be at the rate of Rs. 600 per M. cft. (para 11.39).

I. For minor irrigation works constructed in tribal areas, community development blocks and under the scheme of repairs and restoration of ex-malguzari tanks concessional rates lower than the canal water rates should be charged (para 12.15).

J. For avoiding wastage of water, the bulk supply rate should be charged where the wastage is detected (paras 10.21 and 12.4).

14.7. When water is wasted and the offenders are not traceable joint levy on the cultivators under the water course or field channel should be charged at bulk rates (para 11.21).

14.8. The water rates should be periodically examined and revised after 5 years (para 11.17).

14.9. In order to increase the efficiency of irrigation beyond out-let, the Committee recommend that field to field irrigation should be discouraged and gradually replaced by a system of water-courses, out-lets should be provided with face walls both up-stream and down-stream and should have suitable controls for regulation of supplies; and Irrigation Sub-Committee under Gram Panchayat should be constituted for equitable distribution of water and checking wastage (paras 12.4, 12.5, 12.8 and 14.4).

14.10 In order to popularise irrigation, the cultivators should be provided with cheap credit for land improvement and for improved agricultural practices, field channels should be got constructed, agricultural extension activities under Community Development Programme should be pursued, and ware-housing and marketing facility be provided. Introduction of land reforms for consolidation of holdings will help the agriculturists and would encourage them to grow irrigated crops. Government should also actively pursue the price support policy in order that the cultivator is assured of a reasonable price for his produce (see paras 12.10, 12.11, 12.12, 12.13, 12.14, and 12.16)

14.11. In tribal and backward areas concessional water rates as below should be charged for the first two years:—

Crops	First year	Second year	Third year
(1)	(2)	(3)	(4)
Rice and Wheat	Free	Half rates	Full rates.

(See para. 12.15)

14.12. The long-term agreement system which is in vogue in Mahakoshal region should continue in that region. In the Madhya Bharat region the one year agreement ('Ailan') which has been in force there should continue. It should also be extended to Vindhya Pradesh. For the districts of Jabalpur, Damoh, Seoni, Saugar, Sehore and Raisen, the villagers should be given the option to make long-term agreement, one year agreement or to take water on demand (see para 12.21).

14.13. The method of collection of irrigation revenue should be uniform throughout the State. It should be realised by the Irrigation Sub-Committee under Gram Panchayat. The Canal Deputy Collectors should be given magisterial powers so that he can effectively discharge his duties (see paras 12.24 and 12.26).

14.14. Ex-malguzari tanks irrigating less than 100 acres should be handed over to the local bodies for maintenance and management. These bodies should recover the irrigation cess from the beneficiaries and use the amount for the up-keep of works (see para 10.24)

14.15. On account of quick results achieved from minor irrigation works which can be constructed by mobilising local resources and for which sites are available all over the State, their construction is recommended on a priority basis (see para. 7.22).

14.16. The yard-stick of financial productivity prescribed by the Planning Commission is not considered suitable for the State as the area under irrigation here is lowest. This yard-stick should not come in the way of financing irrigation projects in the State (para. 5.17).

14.17. The rivers of State have enormous water potential. These need to be surveyed by creating a separate circle of superintendence. A planned programme of development of irrigation and hydro-power should be chalked out for the next 20 years and full co-operation of the Irrigation Department and State Electricity Board should be enjoined, (paras. 13.15 and 13.16).

14.18. In order to reap full benefits of irrigation there should be complete liaison between the Irrigation and Agriculture Departments (para. 12.12).

Signed by—

- (1) Shri Dashrath Jain, Chairman, Deputy Minister, Public Works Department.
- (2) Shri M. L. SOOD, Chief Engineer, Irrigation Branch, Madhya Pradesh.
- (3) Shri N. S. APTE, Director of Agriculture, Madhya Pradesh.
- (4) Shri Y. BHARGAVA, Commissioner, Indore Division.
- (5) Shri A. K. CHAR, Chief Engineer Chambal.
- (6) Shri K. L. HANDA, Superintending Engineer Narmada Circle, Jabalpur.
- (7) Shri J. K. VERMA, Director of Land Records, Madhya Pradesh.
- (8) Shri D. N. KHURANA, Superintending Engineer, Mahanadi Circle, Raipur.
- (9) Shri K. P. PANDE, M. L. A., (with a note of dissent).
- (10) Shri BHUWAN BHASKAR SINGH, M. L. A., (with a note of dissent).
- (11) Shri UDAIRAM, M. L. A., (with a note of dissent).
- (12) Shri KAMTA PRASAD MASTER, M. L. A.
- (13) Shri SHYAMA CHARAN SHUKLA, M. L. A., (with a note of dissent).
- (14) Shri VRINDA SAHAI, M. L. A., (with a note of dissent).
- (15) Shri VISHWANATH AYACHIT, M. L. A.
- (16) Shri BHAGWAN SINGH, M. L. A. with a note of dissent.
- (17) Shri V. Y. TAMASKAR, M. L. A. (with a note of dissent).

- (18) Shri ARJUN SINGH, M. L. A., (with a note of dissent).
- (19) Shri VED RAM, M. L. A., (with a note of dissent).
- (20) Shri SAWAI SINGH MANDLOI, M. L. A.



NOTES OF DISSENT

NOTE OF DISSENT BY SHRI V. Y. TAMASKAR

THE SECRETARY,
WATER RATES INQUIRY COMMITTEE,
BHOPAL.

SIR,

I am herewith submitting a note of dissent to the report of the Water Rates Enquiry Committee. The Note of Dissent may kindly be appended with the report.

BHOPAL:
The 7th February 1961.

Yours faithfully,
V. Y. TAMASKAR,

I agree with the generality of the report except in the following matter:—

The proposal to enhance the water rate in the state of Madhya Pradesh is not equitable. Like education and medicine food is also the prime necessity of life. It is duty of the State to provide food grains to the citizens of the State. Unlike all other marketable commodities, a cultivator is not allowed to sell the food grains in open market. The prices are controlled by the Government. The Government restricts its movements from time to time from one area to the other. To judge therefore increase in prices of food grains on account of irrigation facilities, will be mistaken. The prices of other necessities and requirements of a cultivator are not correlated with the prices of food grains. The prices of other commodities which he has to purchase are shooting up every day. Therefore taking into consideration only the increase in the prices of food grains is likely to be faulty.

As already stated above, it is the duty of the Government to extend the same facilities to a cultivator as are given in the case of educational and medical Institutions and to look at it from the same point of view of National Service. It cannot be put exactly on pure economic considerations. If this were not conceded by the Government, in very many cases, the agriculturist would be tempted not to produce food grains in the same proportion as he is doing now but to progressively change over to a crop which might give them more money and at the same time render themselves liable to administrative controls

The cost of maintainance of the Irrigation Works should not be taken into consideration in assessing the water rate. These works were mostly constructed during the British regime and necessarily were constructed at the huge cost. The administration is top heavy and to force the agriculturist even to share the part of the administrative expenses i.e., maintenance charges will also be unfair.

As is so evident, almost eighty per cent of the people



life is miserably low. Medical, Educational and other facilities inclusive of transport and Communication is almost equal to zero. To force, therefore, the burden of taxation

The Madhya Pradesh consists of various regions and the water rate should be fixed for each region and the crops thereof. Even the crops which are grown in other region be of the same type the territorial conditions should be taken into consideration. The history of the various regions has been different and the history of the irrigation works has been different. Therefore, there cannot be one common formula.

In the end I would suggest—

- (1) that the distinction between the old and new works should be wiped out.
- (2) that there should be compulsory water rate.
- (3) the irrigation cess which is likely to be imposed on a permanent basis should be discarded.
- (4) that the rate should be varying from region to region even for the same crop.
- (5) that the standard applicable for providing irrigation water to the winter crop should be qualitatively different from the one, applicable to the monsoon crops. The paddy crop requires water during the rain when in normal year the rain water runs waste, whereas the winter crop needs water which has to be carefully stored and preserved and distributed.
- (6) a water rate for paddy crop should in no case be increased beyond rupees three and annas ten acre.

V. Y. TAMASKAR.

NOTE OF DISSENT BY SHRI VEDRAM, M. L. A.

In Chapter XI Para. 11.39, the rate for Paddy is fixed at Rs. 8 per acre for Rice Zone (Chhattisgarh).

I am of the opinion that the rate should be; Rs. Six per acre in place of Rs. 8 per acre.

I agree with the other recommendations of the Committee.

BHOPAL :

The 17th February 1961.

VEDRAM, M. L. A.



NOTE OF DISSENT BY SHRI KASHI PRASAD PANDE,
M. A., LL. B., L. A., MINE OWNER.

I am of the view that water rate in case of regulators should be low as their construction does not cost much to Government.

Madhya Pradesh, Jabalpur.
Mangan Kuti, Sihora

K. P. PANDE.



MINUTE OF DISSENT BY SHRI ARJUN SINGH, M.L.A.
Chapter XI.—Criteria for working out betterment levy and
water rate

While dealing with the various criteria for determining betterment levy and water rates in Chapter XI of its report the Committee has not taken note of the wide disparities in the assessment of land revenue in different parts of the State. For example in the districts of Rewa, Satna, Shandol and Sidhi which is almost double of that obtaining in Mahakoshal and yet Shahdol and Sidhi have been included in the rice zone and bracketted with the Mahakoshal districts with uniform rates. Since ultimately all the incidence of betterment levy and water rate is going to fall on the cultivator it would indeed be unfair not to take notice of the excessive land revenue already being charged while determining the betterment levy and water rates. In my opinion therefore the water rates and betterment levy for such areas should be fixed in proportion to the variance in the assessment of land revenue.

The imposition of irrigation cess stipulated in para. 45 of chapter XI should also be imposed keeping in view the variance in assessment of land revenue as mentioned above. I agree however with the general approach and other recommendations of the Committee.

ARJUN SINGH, M. L. A.

NOTE OF DISSENT BY SHYAMA CHARAN
SHUKLA, M. L. A., MADHYA PRADESH.

Mr. Dashrath Jain, Deputy Minister, Public Works
Department, Bhopal.

Dear Sir,

I am enclosing herewith my notes of dissent to the report of Water Rate Committee.

I hope you will please place it on record.

Thanking you,

Yours faithfully,

S. C. SHUKLA.

Camp—Nagpur.
February, 21st, 1961.

c. c. to:—

Mr. Khurana,
Superintending Engineer
(Irrigation), Bhopal.

1. I wish to express my dissent with the recommendation regarding water rates to be charged to cultivators of paddy in Chhatisgarh region.

2. The Committee has recommended that a rate of Rs. 8 per acres per annum be charged to the growers of paddy generally for those cultivators also who enter in to five years agreement as a precondition before they get water in rice Zone.

In my opinion this is excessive in view of the fact that the present irrigation water to the Chhatisgarh rice grower is only a protective irrigation required by him in case of paucity of rain.

Full benefit is derived by the Rice Zone cultivator only in years of failure of rain in September. There is almost no failure of monsoon in the starting months. From our informations and accounts gathered from various old cultivators, the paucity of rains in September seems to be repeating in a cycle once in four years. Once in a while it may vary one year this way or the other. Thus the benefit derived becomes atleast $\frac{1}{4}$ per year by average if once every four year is the incidence of poor rainfall.

The report seems to be a little too harsh on cultivators of paddy. Value of 'Paira' growers is added which is really **not very much** as it is all used up by the farm cattle of the cultivator. For a paddy cultivator the husk on milling of rice is of no value when the wheat husk and plant fetches good price as fodder. But in case of wheat this additional benefit is not added. Value of advantage gained by paddy cultivator in rice zone is stated to be Rs. 73 (para. 11.28). But this does not in to account the fact that the full benefit is derived only once in four years and therefore, per year the benefit in only $\frac{1}{4}$ of this figure.

But this claim is passed over by quoting statistics of lean rainfall over last 50 years as per (Chapter II). Strangely enough deliberate inaccurate deductions and quotations of statistics seems to have been resorted to some how justify higher rates for rice. In para 11.26 it is stated that "data collected by us in Chapter II shows that in the period of 50 years 1908 to 1958 there were 38 years when irrigation could be profitably used. The benefit of irrigation is derived in four out of five years rather than once in five years as reported".

But the facts are quite to the contrary. In Chapter II para. 2.17 regarding rainfall three types of vagaries of monsoon is mentioned viz., the years of early cessation of monsoon, the years of prolonged breaks and years of late commencement of monsoon. In Mahakoshal region which alone has old irrigation work, the total of such years is less than 38—mentioned in para 11.29 and obviously it must be much less than this too if possibility of common years put in the three categories is considered i.e., in the same year there may be late start of monsoon as well as erratic rainfall so also it could be late start and early cessation or early cessation and have intervals in the same year.

Capricious character of rainfall is again discussed in para 7.6 and the deduction therefrom statistics of chapter II are more rational which states "During the past 50 years 20 such failures occurred of which 12 were severe or very severe type".

From above it will be clear that full benefit of additional **5 maunds** in produce due to irrigation is thus derived only once in four years.

Thus to debunk the idea of protective irrigation, inaccurate and perfunctory arguments are advanced. But it really cannot be brushed aside so easily. It is a stark reality and frequent tragedy that vagaries of monsoons once in three or four years causes great hardships to the paddy cultivator which induced every foreign ruler to give priority, to protect the irrigation for this class of cultivator over others who simply wanted to add to their income by irrigation.

In earlier chapters of the report also this aspect is taken note of viz., para 7.6 "that irrigation facilities in such circumstances should be provided, to afford an insurance against partial or complete failure of crops, needs no emphasis." Therefore, it cannot be assumed that the additional benefit by rice cultivators will be in any case not less than five maunds. In fact it will be much less i.e., once in four years. But now at this point I must emphasize the need to be consistent regarding concessions in case of long term agreement and of rate in case of supply on demand or one year agreement. It is really surprising to what extent discriminatory treatment is meted out to the paddy cultivator in the report. It seems that different standards are applied to wheat to reduce rates.

In case of rice zone, rice cultivator is being forced in to long term agreement of five years compulsorily.

In case of wheat only one year agreement is enforced and to that also exception is made in many districts i.e., Jabalpure, Damoh, Seoni, Saugor, Sehore and Raisen where all 3 alternatives will be open to the cultivator. Even if this is justified nothing can justify open discrimination against rice cultivator who though is forced in to long term agreement is given no concession, whereas the wheat cultivator is not asked to pay extra for one year agreement or demand system. In case of paddy though it is subsequently recommended that only long term agreement system be allowed—enhanced rates—i.e., Rs. 10—and Rs. 12 for one year agreement and demand system are mentioned in para 11.28 whereas in case of wheat no such different rates for the 3 categories are even mentioned. Only one flat rate is mentioned in para. 11.30 for wheat and when we read para. 14.6, and 14.13 together the discrimination becomes obvious. I think this is a very unfortunate feature of the report.

In my opinion the water rate in rice-zone for rice should be—

Rs. 4 per acre per crop for long term agreement,
Rs. 6 per acre per crop for one-year agreement,
Rs. 8 per acre per crop for on-demand system

and for wheat in rice-zone:—

Rs. 4 per acre per crop.

In wheat zone for wheat—

Rs. 7-50 nP. per acre per crop for long term agreement,
Rs. 9-50 nP. per acre per crop for one-year agreement,
Rs. 11-50 nP. per acre per crop on-demand.

and for Rice in wheat zone—

Rs. 8 per acre per crop for long term agreement.

Rs. 10 per acre per crop for one year agreement.

Rs. 12 per acre per crop on-demand.

Above rates are higher in wheat zone in view of increased benefit and as compared to rice much less cost of production.

SHYAMA CHARAN SHUKLA.
23-2-61.



श्री उदयराम एम. एल. ए. की विमति टिप्पणी

श्रीमान् सेक्रेटरी,
वाटर रेट्स (इनक्वायरी) कमेटी,
मध्यप्रदेश, भोपाल.

महोदय,

मैं अपनी विभिन्न मत पत्रिका वाटर रेट्स इनक्वायरी कमेटी के रिपोर्ट के साथ संलग्न करने के लिए दे रहा हूँ, कृपया उसे भी रिपोर्ट के साथ प्रकाशित करने की कृपा करेंगे.

भोपाल :
दिनांक ७ फरवरी १९६१.

आपका विनीत,
उदयराम

एम. एल. ए.

मध्यप्रदेश वाटर रेट्स कमेटी की रिपोर्ट काफी परिश्रम से तैयार की गई है वह अपने राज्य के लिये काफी महत्वपूर्ण है. इसके बहुत से हिस्सों को स्वीकार करते हुए भी कुछ अंशों पर मैं अपनी असहमति व्यक्त करता हूँ जो निम्न प्रकार है :—

- (१) समिति द्वारा प्रस्तावित धान के फसल पर प्रति वर्ष प्रति एकड़ सिंचाई दर = रु. अत्यधिक है खास कर छत्तीसगढ़ क्षेत्र में तो जहां "रैनफाल" अधिक है उचित नहीं कहा जा सकता.
- (२) निम्न कारणों से छत्तीसगढ़ संभाग में धान की सिंचाई का एग्रीमेन्ट रेट प्रति एकड़ प्रति वर्ष रु. ३७५ न.पै. से अधिक नहीं होना चाहिए.
- (अ) छत्तीसगढ़ क्षेत्र में जो सिंचाई कार्य स्थापित हैं वे अधिकांश में "फेमिन वर्क्स" हैं जब अन्य क्षेत्रों के लोग अकाल के वक्त सड़क बनाने या उसी तरह का अनुत्पादक काम करते रहे होंगे तब छत्तीसगढ़ के लोग नहर और तालाब बनाने में लगे हुए थे यही कारण है कि वहां की नहरें कम लागत में बनकर तैयार हुई हैं.
- (आ) मध्यप्रदेश में सब से अधिक "रैनफाल" छत्तीसगढ़ क्षेत्र में होता है इसलिये वहां के निवासी प्रमुख रूप से धान की खेती करते हैं. न केवल सिंचित क्षेत्रों में बल्कि असिंचित क्षेत्रों में भी अधिक रैनफाल के सबब धान की खेती अच्छी हो जाती है.
- (इ) छत्तीसगढ़ की नहरें पूर्ण रूप से सिंचाई के योग्य (प्रोडक्टिव) नहीं हैं केवल प्रोटेक्टिव (पूरक या संरक्षक मात्र) हैं. यही कारण है कि जब रैनफाल अच्छा होता है तभी नहरें चल सकती हैं. रैनफाल न हो तो नदी और तालाबों में पानी नहीं रहता तब उस समय नहरें किसानों के खेतों की सिंचाई करने में असमर्थ हो जाती हैं और किसानों को पानी मिले या न मिले एग्रीमेन्ट के शर्त के मुताबिक रकम देना ही पड़ती है.

- (ई) छत्तीसगढ़ में सिंचाई, एग्रीमेन्ट सिस्टम द्वारा की जाती है जिसके अनुभार चाहे किसानों को पानी की आवश्यकता पड़े या न पड़े, निर्धारित रेट के अनुसार प्रति वर्ष पैसा देना ही पड़ता है। यह प्रथा एक तरह से बीमा की तरह की है जिससे कल्पित अकाल की दुर्घटना से किसान बच सके। परन्तु सही तरह से बीमा भी नहीं है क्योंकि अकाल पड़ने पर सिंचाई विभाग की ओर से किसानों को कुछ भी नहीं मिलता।
- (उ) “सिंचाई का लाभ” जितना रिपोर्ट में बताया गया है मेरी राय में उतना किसानों को नहीं मिलता क्योंकि सिंचित क्षेत्रों में असिंचित क्षेत्रों से खेती के ऊपर खर्च अधिक आता है। किसानों की सही आमदनी व खर्च आप देखें तो किसान घाटे में किसानों (धान की खेती) कर रहा है बड़ा किसान जमीन बेचकर या अन्य व्यवसाय द्वारा अपनी गुजर कर रहा है और छोटे किसान मेहनत मजदूरी करके अपना पेट पाल रहे हैं। (देखिए परिशिष्ट 'क')
- (ऊ) छत्तीसगढ़ क्षेत्र के कुछ नये तालाबों पर कुछ रकबा ६.०० रु. और ८.०० रु. में प्रति एकड़ प्रति वर्ष की दर से पांच साल का एग्रीमेन्ट किया गया है उन्हे किसानों की मजदूरी या प्रयोगात्मक एग्रीमेन्ट कहा जा सकता है, क्योंकि किसानों की क्षमता रु. ३.७५ न. पै. से अधिक वाटर रेट देने की नहीं है।
- (३) शासन को आमदनी की निश्चित गारन्टी हो जाय और किसानों को भी अधिक बोज़ न हो इसलिये सिंचाई कार्यों में जो सालाना खर्च—प्रबन्ध और साधारण मरम्मत आदि का आता है उतना ही वाटर रेट लगाना चाहिए। शासन द्वारा किये गये बड़े या छोटे कार्यों में पूंजीगत मूल्यों की वसूली का अधिक ध्यान नहीं रखा जाता क्योंकि यदि उस तरह पूंजी का लागत मूल्य और वार्षिक प्रबन्ध खर्च की वसूली की बात शासन सोचेगा तो शिक्षा और स्वास्थ्य पर होने वाले खर्च की वसूली भुक्त भोगियों से होना संभव नहीं है, इसीलिये लोगों को अन्न, शिक्षा व स्वास्थ्य प्रदान करना शासन का प्रथम कर्तव्य माना गया है।
- (४) आज जब कि देश में करोड़ों रुपये का अनाज बाहर से मंगाना पड़ रहा है तब अधिक उत्पादन के लिये किसानों को प्रोत्साहित करने की अपेक्षा उनसे ज्यादा वाटर रेट वसूल करने की इच्छा वर्तमान समय में उचित नहीं कही जा सकती।

अतः छत्तीसगढ़ रीजन में धान के फसल की सिंचाई दर प्रति वर्ष प्रति एकड़ रु. ३.७५ न. पै. से अधिक नहीं होनी चाहिए क्योंकि अधिक अन्न उत्पन्न करने के लिए किसानों को, जिनकी संख्या ८० प्रतिशत है, प्रोत्साहित करना भी शासन का प्राथमिक कर्तव्य होता चाहिए।

परिशिष्ट "क"

सिंचित रकबे में प्रति एकड़ धान की फसल पर आमदनी व खर्च अनुमानित

आमदनी	खर्च
२१६ रु. धान का मूल्य ६ रु. के दर से २४ मन का	१२० रु. एक एकड़ जमीन की कीमत १,००० रु. पर १ रु. सैकड़ा मासिक व्याज.
१० रु. पैरा का मूल्य	३० रु. बोवाई और व्यासी (एक नागर दर ५ रु. कुल छः नागर)
१० रु. उतेरा (लुवाई भिजाई का खर्च कटकर)	६ रु. बीज एक मन.
२३६ रु. कुल दो सौ छत्तीस रुपये	३० रु. निंदाई और चलाई दो तीन बार
१०६ रु. शुद्ध घाटा (—)	१२ रु. धान लुवाई और ढुलाई ८ रेजा २ कुली.
	१० रु. भिजाई
	१० रु. बाजार तक ले जाने का खर्च प्रति बोरा १। रु.
	४० रु. कम्पोस्ट खाद १० गाड़ी, प्रति गाड़ी ४ रु.
	२० रु. अमोनियम सल्फेट आधा बोरा
	१० रु. अकरम जोताई एक बार दो नागर.
	५ रु. प्रति.
	१५ रु. खेतको सही हालत में रखने के लिए मरम्मत खर्च प्रति वर्ष.
	३० रु. मुगरबीजन चार्ज.
	६ रु. भू-राजस्व और सिंचाई भरना.
३४२ रु. मीजान	३४२ रु. कुल तीन सौ ब्यालीस रुपये मीजान

नोट.—यदि खर्च के मद का पहला भाग अर्थात् जमीन के मूल्य पर सूद निकाल दिया जाय तो किसान को प्रति एकड़ १४) की बचत होती है.

ठाकुर भुवन भास्करसिंह, एम. एल. ए. की विमति टिप्पणी

श्रीमान

सेक्रेटरी, जल-कर (इनक्वायरी) कमेटी,
भोपाल .

महोदय,

मैं कुछ अंशों को छोड़कर पूर्णतः कमेटी की रिपोर्ट से सहमत हूँ. जिन अंशों में मेरा विभिन्न मत है छापया इनक्वायरी कमेटी की रिपोर्ट के साथ प्रकाशित करने की कृपा करें.

विनीत,

भोपाल:
दिनांक ७ फरवरी १९६१.

ठाकुर भुवन भास्कर सिंह,
एम. एल. ए.

१. जल-कर समिति की रिपोर्ट काफी परिश्रम से तैयार की गई है जो अपन राज्य के लिये महत्वपूर्ण व उपयोगी है. मैं कुछ मुद्दों को छोड़कर जल-कर समिति के रिपोर्ट से पूर्णतः सहमत हूँ. कुछ अंशों में अपनी असहमति व्यक्त करता हूँ जो निम्नांकित है.

२. आज देश में अन्न की कमी को ध्यान में रखते हुए राष्ट्र का प्रथम कर्तव्य हो जाता है कि अपना देश अन्न में सेल्फ-सफिशियन्ट हो जाय ताकि बाहर से अन्न न मंगाना पड़े.

यह समस्या राष्ट्र के लिए आनी-बानी की है और अन्न उत्पादन को बढ़ाने के लिए सर्वप्रथम सीढ़ी है, असिंचित जमीनों को सिंचित करना और यही नहरों का महत्व सर्वप्रथम राष्ट्र-निर्माण का प्रथम चरण होता है.

३. हमारा प्रान्त कृषि प्रधान है, जहाँ ८० प्रतिशत लोग कृषक हैं, और उनकी माली हालत खराब है. यदि सरकार कृषकों की दशा सुधारने में सफल नहीं हुई तो सरकार को कामयाबी हासिल न हो सकेगी. इससे जल-कर लगाते समय नहरों का निर्माण तथा जल का वितरण व्यापारी दृष्टिकोण से न देखकर राष्ट्र-निर्माण के दृष्टिकोण से मूल्यांकन करना चाहिए। कृषकों पर, जब तक उनकी हालत न सुधर जाय, जल-कर नहीं बढ़ाना चाहिए.

४. छत्तीसगढ़ क्षेत्र में सिंचाई कार्य स्थापित हैं. वे फेमिन वर्क्स हैं और उनकी लागत भी तुलनात्मक अन्य क्षेत्रों से कम है.

५. छत्तीसगढ़ क्षेत्र में "५५ से ६०" तक पानी गिरता है और इसीलिए धान की खेती इस क्षेत्र में अधिक होती है. जिस वर्ष समय पर ठीक वर्षा होती है पूरे क्षेत्र में पूरा-पूरा धान होता है.

६. जब दुर्भाग्य से पानी कभी वक्त पर नहीं गिरता या उसमें कमी होती है तब ही कृषकों को सिंचाई की आवश्यकता पड़ती है और वह प्रोटेक्टिव होती है.

७. छत्तीसगढ़ में एग्रीमेन्ट द्वारा सिंचाई होती है पर सरकार द्वारा पानी की पूरी गैरन्टी नहीं दी जाती.

८. एग्रीमेन्ट द्वारा सिंचाई होने के कारण पानी न लेने पर भी किसान को निर्धारित रकम सरकार को देनी पड़ती है.

९. जिस वर्ष वर्षा कम होती है और किसानों को जल की आवश्यकता होती है उसी वर्ष नहरों में भी पर्याप्त जल नहीं होता और नहर विभाग जल की आवश्यकता के समय जल देने में असमर्थ रहती है.

१०. कृषकों की आवश्यकता की चीजों की कीमत १५ से २० गुना अधिक होजाने के कारण कृषक की क्रय-शक्ति नहीं के बराबर है.

११. कृषक के अन्न पर सरकारी कंट्रोल हो जाने के कारण कृषक उचित मूल्य नहीं पाता.

१२. छत्तीसगढ़ क्षेत्र में औद्योगिक विकास के कारण मजदूरी १५ से २० गुना अधिक हो गई है.

उपरोक्त कारणों को ध्यान में रखते हुए आज की परिस्थिति में जब तक किसान की हालत व देश अन्न की कमी को पूर्ति न कर ले प्रचलित रेट से अधिक जल-कर न लगाया जाय.

पोपाल .

दिनांक ७ फरवरी १९६१.

ठाकुर भुवन भास्कर सिंह,

एम. एल. ए.

सत्यमेव जयते

भगवानसिंह, सदस्य, विधान सभा, मध्यप्रदेश का विमति
टिप्पण

श्री सेक्रेटरी वाटर रेड्स कमेटी,
मध्यप्रदेश, रायपुर.

श्रीमान्,

वाटर रेड्स कमेटी की अन्तिम बैठक दिनांक ७ फरवरी १९६१ को मैंने रिपोर्ट पर विमति टिप्पणी देने को लिखा था.

उपरोक्त सूचना के अनुसार अपनी विमति टिप्पणी संलग्न प्रेषित कर रहा हूँ. छपा कर रिपोर्ट के साथ लगाने का कष्ट करें.

भोपाल :
६ फरवरी १९६१

भगवानसिंह,
सदस्य, वाटर रेड्स कमेटी,
मध्यप्रदेश



जिस भूमि पर कृषि हो रही है उसके लिये, जहां उद्योग चालू हो सकते हैं, उनके लिए, जहां पीने की आवश्यकता है वहां के निवासियों के लिये जल संचय करने और उसके उपयोग में लाने के साधन जुटाने के उपलक्ष में सरकारें सिंचाई कर या जलकर के रूप में कर वसूल करती हैं।

इस सिंचाई कर के निर्धारण के लिए मुख्य रूप से दो प्रकार की पद्धतियां अपनाई गई हैं। एक है भूमि को जल द्वारा सींचने से कृषि में जो अधिक उत्पत्ति हो उसका कुछ प्रतिशत सिंचाई कर के रूप में प्राप्त किया जाता रहे। दूसरा है सिंचाई के वास्ते जल संचय करने और उसको उपयोग में लाये जाने के साधन जुटाने में जो व्यय करना पड़े उसको एक निश्चित अनुकूल समय में उस क्षेत्र से सम्बन्धित समाज से प्राप्त कर लिया जावे।

में सिंचाई कर या जल कर निर्धारण की प्रथम रीति Profit base से सहमत नहीं हैं। अधिक लाभ की रीति के आधार पर कर निर्धारण की रीति में सम्बन्धित समाज के लिये सेवा करने की भावना निहित नहीं है बल्कि एक अनिश्चित काल तक सरकार को कर मिलता रहे यह भावना समिहित है। यह रीति विदेशी हुकूमत के समय की नीति रही है। भारतवर्ष में सिंचाई का ब्रिटिश कालीन इतिहास देखा जावे तो उससे स्पष्ट प्रकट होगा कि उस समय की सरकार ने दया की भावना से या स्थाई रूप से भूमि का अधिक कर प्राप्त होता रहे जल का सिंचाई के काम में लाने का प्रयत्न किया था। कर्तव्य और सेवा की भावना से प्रेरित होकर बहुत कम।

जलवायु की भिन्नता, वर्षा का कम अधिक होना, भूमि की बनावट में स्थान-स्थान पर भिन्नता होना, भूमि का कहीं समतल और कहीं पर ढालू होना, श्रुति का प्रतिकूल तथा अनुकूल होना, कृषक वर्ग की रुचि और परिश्रम में स्थान-स्थान पर अन्तर होना, कृषि उत्पादन की वस्तुओं के भावों में घटा बड़ी होना तथा कुछ और ऐसे विषय हैं जिनके कारण सिंचाई द्वारा अधिक उत्पत्ति का सम्पूर्ण प्रान्त के लिये आज की स्थिति में आंकना संभव नहीं है। यह बतलाना और अन्तर करना कठिन है कि जिस क्षेत्र के किसान को सिंचाई से लाभ है उसी समय में दूसरे स्थान के कृषक को भी उतना ही लाभ है।

सिंचाई द्वारा कृषि में अधिक लाभ का (चाहे कुछ वर्षों के समय के लिये ही क्यों न हो) सिर्फ, अनुमान ही किया जा सकता है जबकि कहीं-कहीं सिंचाई से हानि भी हो सकती है। सिंचाई द्वारा सब तरह की स्थिति और परिस्थिति में अधिक लाभ का अनुमान करना और उसके कुछ प्रतिशत के रूप में सम्पूर्ण कृषक वर्ग से एक सा कर वसूल करना सच्चा न्याय नहीं हो सकता और इसी कारण से मैं इससे सहमत नहीं हूँ।

मध्यप्रदेश की औसत वार्षिक वर्षा ४३-३६ इन्च है। वर्षा द्वारा प्राप्त जल की कुल मात्रा एक करोड़ ४३ लाख एकड़ फीट आंकी गई है। वर्षा द्वारा प्राप्त इस सारे जल की मात्रा मध्यप्रदेश में बहने वाली बड़ी बड़ी नदियों द्वारा चारों दिशाओं से दूसरे २ प्रान्तों के उपयोग में आती हुई समुद्र में जा गिरती है। मध्यप्रदेश की नदियों में सिर्फ वर्षा द्वारा एकत्रित पानी बहता है, बर्फ से पिघल कर आने वाला पानी नहीं।

मध्य प्रदेश का कुल भौगोलिक क्षेत्रफल १० करोड़ ८२ लाख ६६ हजार एकड़ है। ६ करोड़ ३१ लाख ८८ हजार एकड़ भूमि कृषि योग्य है। इस कृषि योग्य भूमि का अधिकतर प्रतिशत सीधे व्यक्तिगत रूप से समाज के अधिकार में है। ४ करोड़ ५१ लाख ८ हजार एकड़ भूमि जंगल पहाड़ हैं।

उस भूमि पर जो सीधे व्यक्तिगत रूप से समाज के अधिकार में है वर्षा द्वारा कुल ८३ लाख ४३ हजार ६ सौ ९१ एकड़ फीट जल प्राप्त होता है, अर्थात् उपरोक्त लिखी मात्रा का जल वर्षा द्वारा उस भूमि पर आकाश से गिरता है.

जिस प्रकार किसी मकान के मालिक को वर्षा ऋतु में अपने स्वयं के मकान की छत पर वर्षा का पानी इकट्ठा करने और उसको व्यवहार में लाने का अधिकार प्राप्त है उसी प्रकार उस भूमि पर जो व्यक्तिगत रूप से समाज के अधिकार में है, पड़ी हुई वर्षा के जल का संचय करने और व्यवहार में लाने का अधिकार उस क्षेत्र की जनता को प्राप्त होता चाहिए.

भविष्य में मध्यप्रदेश के अन्दर ८३ लाख ४४ हजार एकड़ फीट पानी का संचय मेंड बन्दी (Soil conservation schemes) और बांध योजनाओं द्वारा समाज तथा सरकार के प्रयत्नों से सम्भव हो सकेगा.

वर्षा द्वारा प्राप्त इस जल की मात्रा के व्यवहार पर सरकार को सिंचाई या दूसरे प्रकार का जलकर लेने का कोई नैतिक अधिकार नहीं पहुँचता है. परन्तु इस सारे जल की मात्रा को रोके रखने का काम एक व्यक्ति द्वारा सम्भव नहीं है, बल्कि पूरे समाज के प्रयत्नों द्वारा ही संभव हो सकता है इसीलिये समाज के इस आवश्यक कार्य को सरकार द्वारा किया जाना चाहिए और उसके लिए सेवा शुल्क के नाम से शुल्क लेने का सरकार को अधिकार पहुँचता है. साथ ही इस भारी जल की मात्रा को रोकने में और संचय करने में जो प्रयत्न होंगे उसकी सारी लागत समाज के उस भाग से जिससे उसको लाभ पहुँचने का सीधा सम्बन्ध होगा एक निश्चित अनुकूल अवधि में भिन्न-भिन्न स्थानों की परिस्थिति के अनुकूल वसूल किया जाना आवश्यक होगा. ताकि समाज के उस भाग को जिसका इस प्रकार के कामों से कोई सीधा सम्बन्ध न हो हानि न उठाना पड़े.

४ करोड़ ५१ लाख ८ हजार एकड़ भूमि जंगल पहाड़ की भूमि है जो सीधी सरकार के अधिकार में है. इस जंगल पहाड़ की भूमि पर पड़ी वर्षा के जल की वार्षिक मात्रा करीब ५९ लाख ५६ हजार ३० एकड़ फीट होगी. इस जल की मात्रा को औद्योगिक कामों के इस्तेमाल में लाने और दूसरे प्रान्तों के उपयोग में लाये जाने की अनुमति-प्रदान करने का अधिकार सीधा मध्यप्रदेश सरकार को होगा.

इस संक्षेप से स्पष्टीकरण के साथ मैं यह कहना चाहता हूँ कि सिंचाई कर या जल-कर जैसा कर सरकार को नहीं लेना चाहिए बल्कि जल संचय और उसके उपयोग में लाने के साधन जुटाने में जो लागत व्यय आवे वह सम्बन्धित क्षेत्र के कृषक वर्ग, उद्योग; और पीने तथा दूसरे व्यवहार में लाने वाले समाज से जैसी स्थिति हो अनुकूल तथा निश्चित समय में वापिस प्राप्त करना चाहिए. इस लागत व्यय में उतना प्रतिशत छोड़ा जा सकता है जो देश के समूचे समाज के लाभ की दृष्टिकोण से न्यायी हो.

समाज के लिये बिजली पहुँचाने में जो बिना लाभ हानि की नीति अपनाई गई है वह ही नीति मध्यप्रदेश में जहाँ बर्फ से पिघल कर पानी नहीं आता बल्कि वर्षा द्वारा प्राप्त होता है जल पहुँचाने में अपनाई जानी चाहिए.

ऊपर लिखा सिद्धान्त मान लेने से निम्नलिखित निष्कर्ष निकलेंगे:—

- (१) सम्पूर्ण मध्यप्रदेश में बने पुराने तालाबों, बावलियों, और कुओं पर जो सदियों पहले बनाये गये हैं और जिनका निर्माण व्यय कई गुना उस क्षेत्र की सम्बन्धित जनता समाज को लौटा चुकी है

भविष्य में कोई सिंचाई कर नहीं लिया जावेगा. इस प्रकार के लालाब इत्यादि का मरम्मत व्यय सम्बन्धित लाभान्वित होने वाली जनता से एक निश्चित अनुकूल अवधि में वसूल कर लिया जावेगा. देख भाल का सारा खर्च स्थायी रूप से वसूल होता रहेगा.

- (२) वर्तमान बोजना काल से पूर्व और योजना काल में निर्मित जल संग्रह कार्यों पर लगी पूंजी का उतना भाग जो वसूल होना शेष है, उस क्षेत्र की लाभान्वित होने वाली जनता से अनुकूल निश्चित अवधि में वसूल कर लिया जावेगा, देख भाल का सारा खर्च स्थायी रूप से वसूल होता रहेगा,
- (३) भविष्य में निर्मित होने वाले कार्यों का सम्पूर्ण लागत व्यय एक निश्चित अनुकूल अवधि में वसूल होगा इस लागत व्यय का उतना भाग जो समूचे समाज के हित की दृष्टि से न्यायी ठहराया जा सके कम किया जा सकेगा

उपरोक्त नीति अपनाये जाने से निम्न प्रकार के लाभ होंगे :—

- (१) जल संचय करने और सिंचाई के कामों में उसके प्रयोग की गति तीव्रतर होती जावेगी. कृषक समाज आगे आकर सरकार का हाथ बटावेगा जबकि आज सिर्फ सरकार अकेली प्रयत्नशील है.
- (२) मुफ्तखोरी की भावना कम होगी और उचित स्थान तथा पुरुषार्थी कृषक वर्ग को सिंचाई के साधन मिलने में प्राथमिकता मिलती जावेगी.
- (३) किन्हीं स्वार्थों की दृष्टिकोण से काम किये जाने की सम्भावना की कोई गुंजाइश नहीं रहेगी वरन् देश और समाज को लाभ पहुंचे इस दृष्टिकोण से काम होने लगेंगे
- (४) समाज सीधी अपनी जुम्मेवारी अनुभव करेगा, देखिनक, टेक्नीकल पुरुष और जल से लाभान्वित होने वाला शेष समाज अधिक से अधिक निकट आ सकेगा जबकि आज की दशा इसके विपरीत है.
- (५) जिस कृषक वर्ग को आज सिंचाई के साधन उपलब्ध नहीं है उसको कम से कम इतना सन्तोष और आशा रहेगी कि उसके टैक्स के रूप में सरकारी खजाने में एकत्रित धन से जहां आज दूसरे किसान को लाभ पहुंचा है वहां दूसरे समय उस धन की वापसी पर उसको भी लाभ पहुंचेगा. लागत पूंजी डूबेगी नहीं बल्कि उसमें वृद्धि होती जावेगी और उस धन का फैलाव (Circulation) स्थापित रहेगा.

सिंचाई विभाग

भविष्य में सिंचाई विभाग का काम बिना प्रत्येक प्रकार का आवश्यक सम्पूर्ण सर्वे किये बिना अलग हिसाब कहीं भी जल संचय का काम हाथ में लेकर बाँध निर्माण कार्यों की ठेकेदारी करना मात्र नहीं रह जावेगा बल्कि संपूर्ण मध्यप्रदेश की कृषि योग्य भूमि में सिंचाई के वास्ते जल उपलब्धि कराने के दृष्टिकोण से यह बतलाना होगा कि प्रत्येक दस एकड़ कृषि योग्य भूमि की इकाई पर किस प्रकार से जल संचय और जल उपलब्धि का कार्य किया जा सकता है.

६ फरवरी १९६१.

भगवान सिंह,
सदस्य, वाटर रेड्स
कमेटी, मध्यप्रदेश.



श्री वृन्दासहाय एम. एल. ए. का विमति टिप्पण

श्री चैयरमैन सा.

वाटर रेट कमेटी, भोपाल.

प्रिय महोदय,

वाटर रेट कमेटी की जो रिपोर्ट तैयार हुई है जिस पर मैंने हस्ताक्षर किये हैं उससे पूर्णतः सहमत होते हुए चेप्टर ११ पैराग्राफ ३८ के कुछ भाग से सहमत नहीं हूँ. इस सम्बन्ध में मेरा विरोध इस प्रकार है :—

(Sugarcane) का जो हम ने नया रेट निश्चित किया है उसके साथ हमने बोने का समय (Sowing period) निश्चित नहीं किया है. इसके लिए यह निर्देश दिया गया है कि (Local condition) के अनुसार विभिन्न स्थानों में समय निश्चित किया जावेगा. मेरा मत है समय स्पष्ट न होने से अनेक कठिनाइयां उत्पन्न होंगी और कृषकगण परेशानी में पड़ जावेंगे.

गन्ना बोने का समय राज्य के विभिन्न स्थानों में देखते हुए अक्टूबर से मार्च तक का है. इस बीच में गन्ना बोया जाता है. गन्ना बोने का सबसे अच्छा महीना अक्टूबर का माना जाता है. इस महीने में न तो विशेष गर्मी होती है और न ठण्ड ऐसी (Climate) में गन्नों का बीज अच्छी तरह अंकुरित होता है जो सब से अच्छा (Yield) देता है. यदि हमें गन्ने के उत्पादन में वृद्धि करना है तो अक्टूबर के माह में गन्ना बोने के लिये कृषकगणों को प्रोत्साहन देना है. इसलिये मेरा मत है गन्ना बोने का समय माह अक्टूबर से माह मार्च तक का रिपोर्ट में स्पष्ट कर देना चाहिए.

जो गन्ना अक्टूबर में बोया जाता है उसको पानी माह जून तक ६ महीने लगता है. यदि जून में जल्दी वर्षा हो जाती है तो केवल ८ महीने पानी लगता है. यदि वर्षा के अन्तिम माह अक्टूबर में पानी बरस जाता है तो फिर गन्ने की फसल में पानी देने की कोई जरूरत गन्ना कटने तक नहीं होती है. यदि इस माह में वर्षा न हो तो एक पानी नहर का और लगता है. इस तरह अक्टूबर से अक्टूबर तक १३ माह का एक वर्ष गन्ने का माना जाना मेरी राय में उचित है.

आशा है आप मेरा यह मत रिपोर्ट में व्यक्त करने की कृपा करेंगे.

भवदीय,

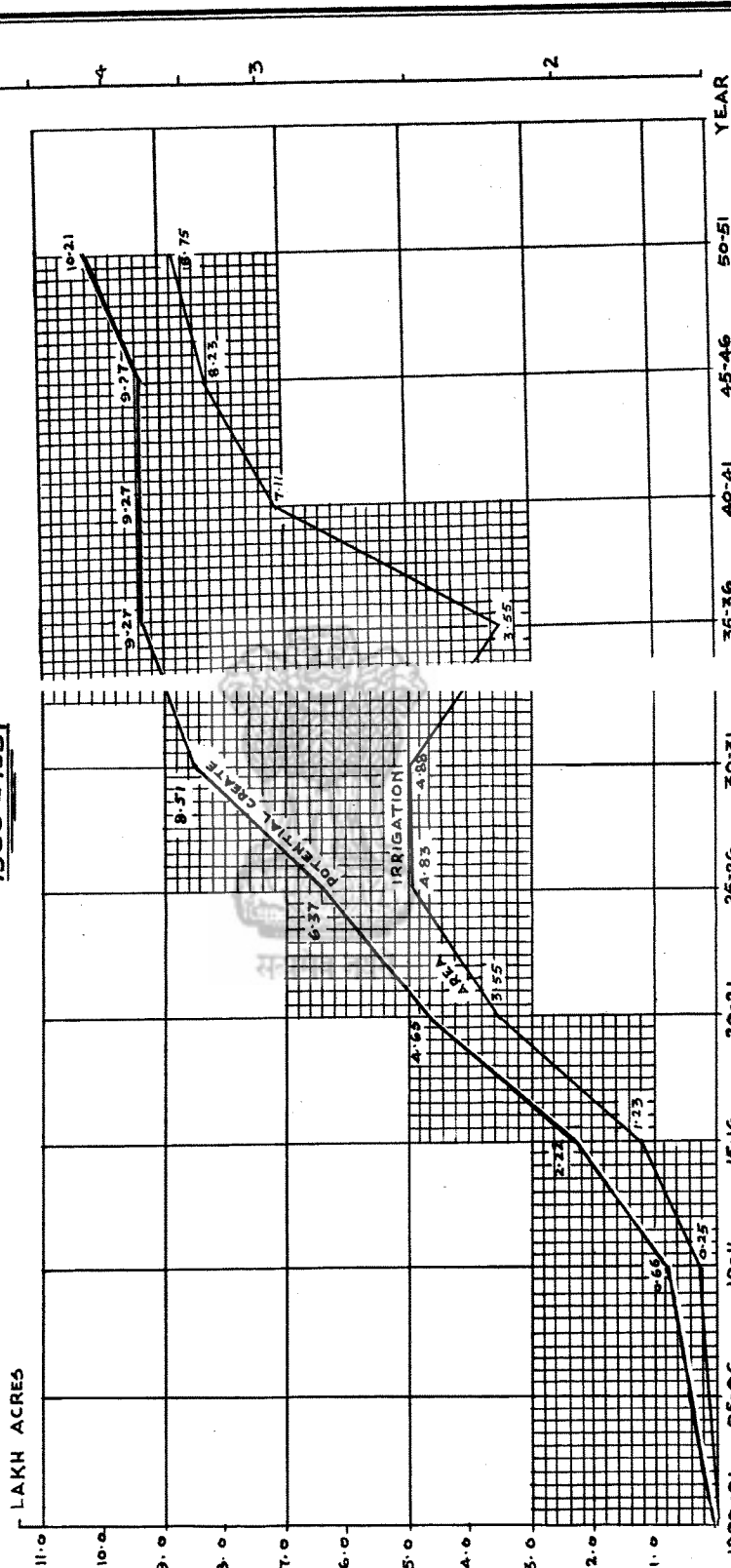
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वृन्दा सहाय,
सदस्य, वाटर रेट कमेटी.

IRRIGATION POTENTIAL CREATED

& AREA IRRIGATED

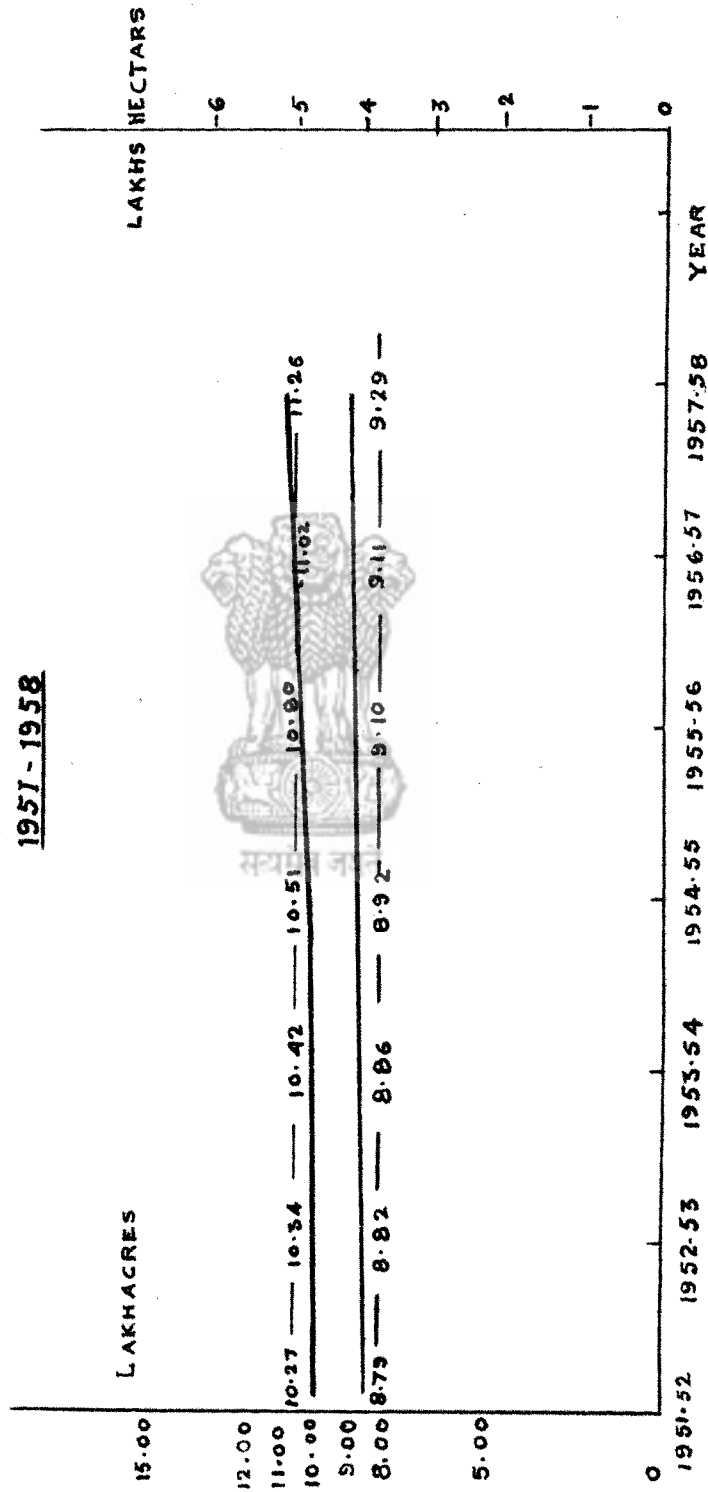
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IRRIGATION POTENTIAL CREATED AND

AREA IRRIGATED IN ACRES AND HECTARES.

1951-1958



IRR. POTENTIAL CREATED.....
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IRRIGATION POTENTIAL CREATED AND AREA IRRIGATED IN ACRES AND HECTARES.

1951-1958

