COPP/MIT/1959/2

REPORT
ON
INOR IRRIGATION WORKS
IN
MYSORE STATE

COMMITTEE ON PLAN PROJECTS
(IRRIGATION & POWER TEAM)
NEW DELHI
SEPTEMBER, 1959

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LETTER OF TRANSMITTAL

No. COPP/MIT/93/58
Raj Bhavan.
Chandigarh,
September 10, 1959.

My dear Pantji,

In continuation of my letter No. COPP/MIT/93/58 dated the 10th April 1959, I have great pleasure in forwarding herewith the Main Report of the Minor Irrigation Team on Mysore.

I understand that the experiments on the Desilting-*cum*-Reclamation scheme as proposed in the Interim Report are still in progress and it is hoped they will prove a success, in which event desilting measures can be adopted on a large scale in the Third Five Year Plan

With regards,

Yours sincerely,
N. V GADGIL

Shri Govind Ballabh Pant,
Minister for Home Affairs,
Government of India,
New Delhi

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MAPS

PREFACE

Every endeavour has been made to make the Main Report self-contained in all essential details. The broad approach in regard to the major proposals remains the same as in the Interim Report. However, some additional details have been incorporated so as to clarify the nature and scope of recommendations, the practical success of which depends on how far the several changes in the technique of maintenance of tanks as indicated in this Report are adopted.

2. It may be added that the experiments on Desilting-*cum*-Reclamation were taken up in hand soon after the Interim Report was presented. The Members of the Team visited the sites on which the experiments were in operation in the last week of June 1959 and gave necessary advice on the problems faced so as to successfully conduct these experiments. Their observations have been incorporated in this Report.

3. Certain procedural and administrative measures are suggested in order to give effect to these recommendations effectively. This Report is expected to provide the main base on which the Desilting-*cum*-Reclamation Scheme may be formulated for inclusion in the Third Five Year Plan of the State.

4. For Terms of Reference and composition of the Team, as also for detailed observations about Desilting-*cum*-Reclamation, and water utilization and Agricultural aspects, attention is invited to the Interim Report on Minor Irrigation Works in Mysore State—April 1959.

5. We deeply appreciate the co-operation extended by Shri B. D. Jatti, Chief Minister, Shri T. Mariappa, Minister for Finance, Shri H. M. Channabasappa, Minister, P.W.D., Mysore State also Shri P. V. R. Rao, I.C.S., Chief Secretary to the Government, Shri M. H. Manchigiah, Chief Engineer, Irrigation and Public Health and Shri Mallaraj Urs, Director of Agriculture. Thanks are also due to Shri Indarjit Singh, Secretary (COPP), for the help given by him from time to time for the early and successful completion of this Report.

CHAPTER I

GENERAL ASPECTS

The most important source of irrigation in Mysore State is the tanks which alone account for 7.77 lakh acres—about 44.7 per cent of the total irrigated area of 17.4 lakh acres followed by 3.68 lakh acres (21.1 per cent) irrigated by Government canals, 0.10 lakh acres (0.6 per cent) by private canals, 3.22 lakh acres (19.5 per cent) by open wells and 2.62 lakh acres (15.1 per cent) by other miscellaneous sources like lifts, pick-ups and anicuts.

2. The State has the advantage of both South West Monsoon from June to September and North East Monsoon from October to December. Intensity of rainfall ranges from about 250″ per annum in 'Malnad' *i.e.*, bordering the Western Ghats to as low as 10″ to 15″ in 'Maidan'—a comparatively flat region. The maximum rainfall has been 505″ per annum at Agumbe in Shimoga District. The three factors *viz.*, rainfall, configuration and soils have determined the nature of utilisation of water for purposes of irrigation. The valleys and sub-valleys have been bunded up to effect storages to serve the needs of a village or groups of villages. Distribution and seasonal precipitation of annual rainfall have conditioned the development of three main Irrigation Zones, *viz.*

(1) Western Zone
(2) Central Zone and
(3) Eastern Zone

as also the system of irrigation in these regions which are as follows :—

(*i*) In the Western Zone, characterised by heavy rainfall ranging from 116″ to 350″, paddy is grown in plenty due to extremely wet conditions. Since, due to porous nature of the soil (laterite soils) rain water is quickly drained off soon after Monsoon showers, tanks of small size have been constructed in large numbers.

(*ii*) In the Central Zone, where annual rainfall is not so abundant and varies from 20″ to 40″, relatively bigger tanks are found On account of the medium texture and clayey nature of soil in this Zone, sugarcane, paddy, groundnuts and some rabi crops are grown.

(*iii*) In the Eastern Zone, mostly a dry area with annual rainfall of 15″ or less and soil comparatively light, all available water is preserved in series of tanks. Lift irrigation is also practised with the help of picottas and pumps. Mostly paddy, ragi, jowar, groundnuts and some rabi crops are grown in this Zone.

3. Where rainfall is continuous from June to September *i.e.*, region of 130″ to 160″ rainfall, tanks are of a size just enough to supply water for irrigation in the months of October and November when crops need some watering, rains ceasing by then. For this reason the atchkets, below such tanks, are much larger in proportion to the size of the tanks. In areas where rainfall is about 60″ the proportion is about 1 : 10. In other

regions where intensity of rainfall is about 25" to 30", the capacity of these tanks is greater than that in the previous case.

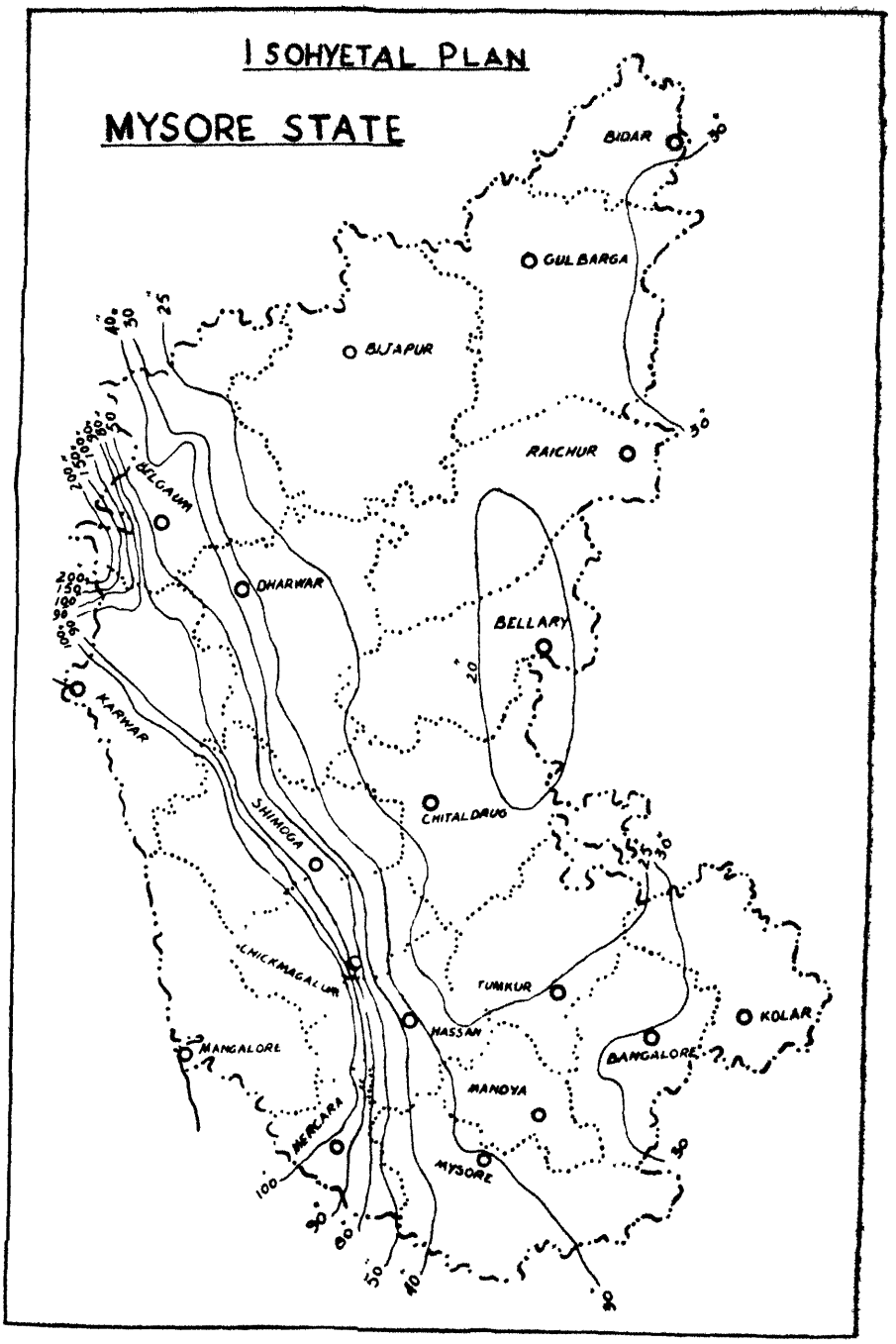
4. In South Mysore total number of tanks is about 25,000. They are are classified into major and minor for purposes of administration, accordingly as the assessment thereon is more or less than Rs. 300 respectively. Majority of the tanks in each District belong to the category of minor tanks. There are just 12,000 tanks in North Mysore, with a total of about 37,000 in the whole State. Districtwise details are given below :—

Sl. No.	District	No. of minor tanks	Atchket in acres
1.	Bangalore	1,459	26,056
2.	Tumkur	935	25,141
3.	Kolar	2,870	48,372
4.	Mysore	921	10,964
5.	Mandya	718	8,720
6.	Hassan	6,901	71,152
7.	Shimoga	6,508	1,19,209
8.	Chitaldrug	252	9,676
9.	Chickmagalur	2,198	30,952
		22,762	3,50,242

Sl. No.	District	No. of major tanks	Atchket in acres
1.	Bangalore	328	53,171
2.	Tumkur	342	95,812
3.	Kolar	546	79,956
4.	Mysore	86	16,776
5.	Mandya	124	26,109
6.	Hassan	286	36,131
7.	Shimoga	583	77,222
8.	Chitaldrug	149	36,784
9.	Chickmagalur	123	26,341
		2,567	4,48,302

Data for Districts transferred after Re-organization

Sl. No.	District	No. of tanks	Atchket in acres
1.	Bellary	187	15,000
2.	Belgaum	757	16,000
3.	Gulbarga	—	12,000
4.	Dharwar	3,653	1,09,000
5.	Bidar	31	300
6.	Bijapur	30	1,000
7.	Karwar (N. Kanara)	5,819	34,000
8.	South Kanara	167	14,000
9.	Raichur	674	11,000
10.	Coorg	201	5,000
		11,519	2,17,300


ISOHYETAL PLAN
MYSORE STATE
BIDAR
GULBARGA
BIJAPUR
RAICHUR
BELGAUM
DHARWAR
BELLARY
KARWAR
CHITALDRUG
SHIMOGA
CHICKMAGALUR
TUMKUR
KOLAR
HASSAN
MANGALORE
BANGALORE
MANDYA
MYSORE
40
30
25
50
100
150
200
90
80
60
20
10

5. There are also canal systems drawn from anicuts for irrigation, some of them constructed centuries ago across various perennial rivers and streams. Some of the more important of these works are as follows :—

Sl. No.	Name of work	Irrigated area in acres
1.	Kattepur ane Cauvery valley	5,590
2.	Chamaraja ane Cauvery valley	19,914
3.	Mirle ane Cauvery valley	3,175
4.	Ramasamudram ane Cauvery valley	5,381
5.	Hanagode ane Cauvery valley	6,755
6.	Kattemalavadi ane Cauvery valley	598
7.	Siriyur ane Cauvery valley	460
8.	Nugu anicut ane Cauvery valley	5,045
9.	Chickkadevaraya ane Cauvery valley	21,386
10.	Devarya ane Cauvery valley	2,372
11.	Varajaradi ane Cauvery valley	9,073
12.	Madhavamanathri ane Cauvery valley	3,874
13.	Hulluhalli anicut Cauvery valley	6,701
14.	Maddur ane across Shimsha	3,256
15.	Mandagore ane Cauvery valley	11,378
16.	Hemagiri ane Cauvery valley	2,233
17.	Srirama Devaru Dam	9,093
18.	Bhadra anicut in Shimoga Dist.	12,000
19.	Old Vijayanagar channels in Bellary Dist. Tungabhadra valley ..	11,337
20.	Tungabhadra channels in Raichur Dist. Tungabhadra valley ..	7,791
		1,47,412

Large reservoirs such as Krishnarajasagar have come into being and have contributed 2 lakh acres to the irrigated area. However, utilisation of river-waters is restricted as the riparian rights of Madras State have to be protected in accordance with the Agreement* entered into with that State in 1892.

6. Sub-soil water is being utilised by means of numerous wells. Areas under each, however, are very small and limited to the meagre supplies due to shallowness of wells and manual means of lifting water. However, there has been extensive and intensive cultivation by lift irrigation utilising electric power wherever available. Districtwise details of the number of such wells are given below :—

	District	No. of wells (Irrigation Pump sets)
1.	Kolar	3,175
2.	Tumkur	2,166
3.	Chitaldrug	1,892
4.	Shimoga	395
5.	Bellary	434
6.	Bangalore	2,368
7.	Mysore	585
8	Mandya	159

*Appendix VI

(1)	(2)	(3)
9.	Hassan	219
10.	Chickmagalur	108
11.	South Kanara	315
12.	Dharwar	44
13.	Raichur	1
14.	Coorg	—
15.	North Kanara	—
16.	Belgaum	—
17.	Bijapur	—
18.	Bidar	—
19.	Gulbarga	—
	TOTAL ..	11,861

The irrigation is of the order of 1.16 lakh acres or 10% of the total irrigated area in the erstwhile Mysore State.

7. The cultivated land is of the order of 280.06 lakh acres or 61.9% of the total area of 452.46 lakh acres. According to statistics available for the year 1956, total area irrigated is 17.39 lakh acres in the whole State of Mysore and the same in the erstwhile Mysore State was about 11 lakh acres. Although the newly added area (44835 square miles) is 1½ times the area of erstwhile State (29458 square miles), addition to the irrigated area is only half (6 lakh acres) pointing to the need of development in those areas.

8. The State has been paying special attention to the development of irrigation and allotting funds not only creating new sources of supply in the shape of major and medium irrigation projects but also for the restoration of old tanks which on account of natural causes would have lost their original efficiency or put out of action on account of breaches. In the year 1951 owing to widespread scarcity of food in the country, Grow More Food Campaign was initiated and financed by special allotments granted by Government of India. In the First Five Year Plan 1951—56, an expenditure of Rs: 241 lakhs was incurred on these works. During the latter part of the year 1957, greater emphasis was laid on intensive development of minor irrigation works. Works costing Rs. 10 lakhs and below were brought under Special Minor Irrigation Scheme Programme. On receipt of specific allotments for this purpose, which were Rs. 50 lakhs for 1957-58, and 60 lakhs for 1958-59, programmes were drawn up, and works started. A sum of Rs. 29 lakhs had been utilized during the period December 1957 to June 1958. An additional sum of Rs. 25 lakhs has also been sanctioned. Up to the end of March 1959, 2067 works were included in the programme, providing irrigation benefits to 54501 acres (Appendix II).

9. The State is in possession of useful information in regard to the large number of tanks, collected during 1903—06 and compiled in the form of

(1) Serial Maps,
(2) Serial Registers,
(3) Supply Registers,

(4) Taluk Registers, and

(5) Taluk Maps.

Thus there is a distinct advantage for planning Minor Irrigation Programme in a rational manner as follows :—

(*i*) Serial Maps prepared to scale 1"—1 mile, give the position of every tank-major or minor. All the tanks have been numbered serially from head of the sub-valleys and valleys.

(*ii*) Serial Registers give full particulars of location of the tanks valley or sub-valleywise *i.e.*, the village in which it is situated, reference to the number in the map, ayacut, revenue and ayacut under occupation and revenue during the year the statistics were compiled, water-spread, capacity, maximum depth and drainage area with remarks regarding its condition at the time. (Appendix III).

(*iii*) Supply Registers give information in regard to the tank's own catchment area, average rainfall, nature of catchment, estimated supply from tank's own catchment and estimated surplus from tanks above, capacity of the tank, estimated supply taken up by the tank and supply available for the next tank in the series. In these registers classifications of the nature of catchment have been limited to four, the yield per square mile being fixed for each. The Handbook of Specifications issued by the P.W.D. in 1958 has recommended Mr. Mc Hutchin's Table for adoption. This has seven types of catchments. The yields per square mile accordingly differ from those given in the supply registers. The supply registers, therefore, need to be reviewed urgently in the light of the Mc Hutchin's table, as it is helpful in the preparation of projects (Appendix IV).

(*iv*) Taluk Registers, for purposes of administrative convenience, are also available taluk-wise. Information is, however, given in the same form as in the case of Serial Registers but of only such tanks which come within the jurisdiction of the taluk (Appendix V).

Thus the statistics-technical and otherwise—are readily available from the registers. They were compiled by a special staff and form a valuable basis in the preparation of projects for restoration of old and construction of new tanks. Whenever projects are prepared for restoration of tanks, the statistics are verified and supplemented in respect of such tanks and those that are connected with it in the sub-series only, although to a limited degree. It is, therefore, recommended that these Registers may be scrutinized afresh and brought up-to-date by the Investigation Unit and printed. Priority may, however, be given to the printing of Serial Registers. Simultaneously, action may aslo be taken to compile such statistics in respect of those areas which have been newly added as a result of reorganisation of States.

CHAPTER II

UTILISATION AND CONSERVATION OF WATER

The Mysore State as mentioned earlier is a plateau with Western Ghats on the extreme West. The few streams that flow West into the Arabian Sea pass through a narrow strip comprising steep valleys and thick jungle so much so that the river flow could not be used for irrigation. The rivers flowing to the East pass through comparatively wider areas and enter into the neighbouring States of Madras and Andhra Pradesh. The configuration of the country and varying intensities of rainfall determine the manner of utilising the waters in these valleys. The tank system was developed centuries ago. This shows that a concerted effort was made to utilize the natural resources for irrigation by building storage reservoirs to meet the needs of the region. They vary in size from mere ponds to large lakes and irrigate in the aggregate 6 lakh acres. With the resources then available, utilisation of waters for irrigation in those days fully met the requirements of most of the villages in this State. These tanks in course of time were breached on account of —

(*a*) Lack of regular maintenance—some bunds were used as bullock-cart tracks;

(b) Leaky sluices;

(*c*) Inadequate and/or inefficient escapes; and

(*d*) Abnormal rainfall.

2. The flows in the rivers and streams have been diverted for irrigation by means of low masonry anicuts with channels drawn therefrom with suitable designs. These have been in existence for a number of years and have not suffered from deterioration as in the case of the tanks, on account of the regular attention they have received every year and the nature of their construction.

3. The utilisation of the waters in the above manner is limited as the riparian rights of Madras State into which most of the rivers flow have to be protected. This is defined by an Agreement entered into with that State in 1892 wherein "the limits within which no new irrigation works could be constructed without previous reference to the Madras State" have been specified. (Appendix VI)

4. In South Kanara and Coorg Districts paddy cultivation is practised mostly with the help of rainfall. In the short periods after its cessation which is in the latter part of monsoon, it requires watering to get a full crop. To meet this requirement there are practically no storage works as in erstwhile Mysore on account of the configuration of the tract. There are only 200 tanks in Coorg District and 40 tanks in South Kanara. Therefore to obtain the supplies of water after the Monsoon, earthen bunds are constructed across the streams and by means of channels drawn from them, water is supplied to such of the lands as can be commanded. These earthen structures put up by the cultivators get washed away in the Monsoon and are put up every year as the flow in the streams gets managable. Masonry anicuts are also being constructed to form permanent and improved sources of irrigation ensuring adequate water for maturing crops and to bring good areas under the second crop.

5. A few valleys have a flow of water for longer periods beyond the rainy season *i.e.*, from June to end of September or middle of October. In such cases, construction of low anicuts and channels therefrom are useful for supplying water to fresh cultivation. Works of this type are being recently taken up and it is recommended that this programme may be intensified. The Team observed during its visit to Coorg District (Madalapur Anicut Scheme) that even during construction period substantial areas had been developed and crops raised.

6. The natural resources having been exploited to the maximum extent, there are practically no possibilities of creating new storages in the minor and subsidiary valleys. The process of silting has aggravated the problem by reducing the capacity of most of the tanks with the result that sufficient water is not available for the existing atchkets.

7. Most of the areas in Mysore State comprise rolling or undulating lands highly susceptible to soil erosion, more especially when rainfall is heavy. By soil-erosion not only valuable lands are being devastated but the soil nutrients from the upper surface of the soil are also washed down into the tanks. Prevention of silting of tanks pre-supposes prevention of soil erosion from the catchment area, foreshores of tanks which of late have begun to be cultivated for increased food production. Soil loosened by cultivation is easily washed into the tanks with the very first showers of rain. If the foreshores of the tanks are covered with some vegetation, then soil erosion and accordingly silting of tanks, can be greatly minimised if not completely eliminated. Presence of vegetation not only binds the particles of soils and prevents soil from being washed down by the flow of water but it serves as sieve through which water has to pass and grass obstructs flow of water and forces the silt to deposit. Water absorbing capacity is also enhanced by the existence of vegetation. In this connection a large number of experiments have been conducted all over the world—a few examples are given in Appendix VII, to appraise the gravity of the problem. Soil conservation tests carried out by Bombay State Agriculture Department *vide* Agriculture College, Dharwar, publication, March 1957, 'Soil-Conservation Studies', showed that the water losses by run-off (in percentage of total run-off) were as much as 32.51% in case of Rabi Jowar cultivation, and reduced to only 7.93% when the land was under natural vegetation. Similarly, it was calculated that whereas the average annual soil loss per acre was as high as 57.55 tons, it was reduced to only 0.215 ton in the case of soil under natural vegetation. The Bombay State Agriculture Department, discussing the cropping practice in the Bombay Deccan area has calculated that whereas it will require as many as 1252 years to erode 7" of soil if it is under natural vegetation, this much soil can be eroded in the course of only twenty-seven years if the land is brought under Jowar cultivation.

8. Water spread in most of the tanks in the State is inordinately large as compared with the corresponding atchket or ayacut (Appendix VIII), with the result that an appreciable quantity of water is lost either by evaporation or by percolation through the beds of tanks. While percolation losses can be compensated by lift irrigation from open wells in and around the adjoining atchket, evaporation is a dead loss. The intensity of the losses has been appreciated all over the world and experiments have been carried out in foreign countries—a few examples are given in Appendix IX. Experiments were also conducted by Madras Agriculture Department to

determine the water requirements of ragi and sorghum crops and to judge the relationship, if any, existing between the water requirements of these crops and the amount of water lost by evaporation from free water surface. The experiment had shown that the total loss of water by evaporation from free water surface as in case of tanks amounted to thirty inches during the whole period of the growth of crop, as against twenty-five inches, with slight variations, required by these two crops during the same period, showing that the amount of water lost by evaporation from free water surface, as in tanks, was even more than that required by the crops on an equivalent area. Evidently, the amount of water required for crops included not only the loss by transpiration but also loss by evaporation from ground surface, apart from some loss of percolation.

9. A good deal of experimental work has also been done by Punjab Irrigation Research Laboratory at Amritsar and at other places to determine the losses of water by evaporation from free water surface as in the case of tanks and reservoirs. *The evaporation losses are estimated at about 0.4″ a day in Summer and 0.2″ a day in Winter. † Evaporation losses at seven different stations in Mysore State representing different regions—North, South, East, West and Central—show that the lowest annual loss is 46.6″ in the case of Mangalore, where humidity is relatively high, being a coastal town. and as much as 143.7″ at Raichur, 141.4″ at Gulbarga, 99.6″ at Chitaldrug, 91.9″ at Belgaum, 65.2″ at Bangalore and 47.8″ at Hassan giving an average of 91″ loss per year for the State as a whole. (Appendix X).

10. It will be worthwhile to appreciate the significance of loss by evaporation from tanks in terms of water requirements of farm crops. Madras State Agriculture Department has worked out the water requirements of ragi and jowar corps at twenty-five inches with slight variations each respectively during the entire period of their growth. In spite of relatively dry climate with a moderate rainfall, (*i.e.*, less than that of Mysore) Punjab does not require more than twelve to fifteen inches of artificial irrigation to mature wheat crop.

11. Full implications of the use of cetyl alcohol compound in the "retardation of evaporation losses" have not yet been worked out on the basis of experiments carried out in the U.S.A. Experiments have, however, been conducted to ascertain the effect of mono-molecular films of cetyl alcohol compounds on the evaporation of water at different temperatures. Results of these experiments have shown that at a water temperature of 68°, there has been sixty percent reduction in evaporation. According to Indian Journal of Meteorological and Geo-Physics, the use of mono-molecular film of cetyl alcohol compound on large reservoirs and tanks, has no doubt certain limitations, particularly as regards wave action, but experiments are in progress to overcome these difficulties. It is quite possible that the process may not prove to be an economical proposition under Indian conditions in all tanks and in all localities. But it is sure to prove economical at least in certain areas which have to face acute scarcity of water even for drinking purpose and where tanks dry up quickly and are of small sizes in compact blocks and where disturbances of water surface in tanks by strong winds can be lessened by providing heavy wind

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Irrigation Engineering Vol. II, page 10 by K. R. Sharma.
Indian Meteorological Department Scientific Notes, Vol. IV, Nos. 61—68 (1936).

breaks all around. In many places as soon as tanks dry up, people are forced to actually cart water from distances even for the purpose of drinking. In such places retardation of loss by even thirty percent would prove a great boon to the people by prolonging the period of availability of water, so badly needed, both for irrigation and drinking, and without which, not only large areas of land adjoining tanks remain unirrigated but people have to incur heavy expenditure for even securing drinking water. It is true that in places where water is cheap and plentiful the cost involved in retarding evaporation would not be justifiable economically, but it is sure to pay in certain localities where people now incur enormous expenditure in securing water from a depth of a hundred feet from open wells costing half a lakh of rupees each and where the capital cost on providing irrigation facilities amounts to several thousand rupees per acre and where such expensive wells and tanks exist side by side. The typical example of the conditions in Coimbatore District has already been mentioned in the Interim Report (Page 6—Paragraph 13).

12. The Team, therefore, is of the opinion that following measures are necessary to bring about effective conservation, augmentation and economic utilisation of water :—

(*a*) Investigations may be conducted to build new tanks upstream so as to command areas lower down and to supplement the storage lost by siltage;

(*b*) New tanks may also be built lower down and the existing tanks repaired to serve as silt arresters ;

(*c*) Preventive measures may be taken to arrest silting by construction of silt traps along the valley and to conserve soil in the catchment area and in the foreshore lands of the tanks;

(*d*) Wells may be sunk in the atchkets to supplement supplies from tanks,

(*e*) Drainage channels may be provided to prevent and recover water logged areas wherever necessary;

(*f*) The leaky sluices may be repaired to prevent wastage of water from tanks,

(*g*) Water requirements of crops in field condition may be studied on regional basis. Most of the figures quoted in the Technical Journals pertain to studies made in U.S.A. or other foreign countries.

(*h*) A suitable instrument may be found out to measure moisture contents of the soil because it is only on this measurement that additional supply of water can be judged; and

(*i*) Additional power may be provided to facilitate installation of pumps in larger numbers.

13. It was noticed in South Kanara and Coorg Districts, that there are immense potentialities in respect of water sources but large storage works are uneconomical, costs going as high as Rs. 2500 per acre. Therefore, lift irrigation on a large scale is the only suitable solution in these areas.

14. The Schemes* envisaged to intensify lift irrigation with the help of electric power from the rivers in West Coast Districts require to be implemented soon so that benefits may accrue at an early date. In view of electric power becoming available only 6 or 7 years later after the Sharavathi Scheme comes into operation, it is essential that a larger number of pumping installations on the same lines as at present, may be arranged for.

15. The Investigation Units may consider all the above measures for conservation and utilisation in the preparation of projects.

For the proposals of minor irrigation schemes in Coorg District for three years from 1959-60 to 1962-63, please see Appendix XI.

CHAPTER III

SELECTION OF PROJECTS AND PRIORITIES, INSPECTION AND MAINTENANCE

The Revenue Department in Mysore State administers and controls the Minor Irrigation Tanks. All works connected with maintenance of these tanks are, however, executed by the Public Works Department. The works that come under the category of Minor Irrigation are under the administrative and technical control of the Chief Engineer, Irrigation and Public Health. The Superintending Engineers and Executive Engineers are in charge of all the works, with no special staff being set apart to deal with minor irrigation as such. At the sub-division level, all the works are under the charge of an Assistant Engineer who has under him Junior Engineers/ Overseers/Sub-Overseers according to the number and size of the Hoblis (Thanas) in the sub-division, each being responsible for all works in a Hobli.

2. Minor Irrigation works whether of restoration, improvement by increasing capacity of a tank or construction of a new tank, are undertaken at the instance of the villagers who appeal to the State authorities. In certain cases, however, officers of the Public Works Department, initiate the preparation of a project, if during their inspection it is found that the tank has reached such a state of disrepair as would endanger its own safety as also that of the tanks lower down in the series. In the case of the tanks that discharge across railway lines and which are required to be inspected every year before the Monsoon, repair works are arranged, if during periodical inspections, necessity for such repairs is found.

3. The Public Works Department prepares estimates of probable cost of works and takes up the work for execution after going through the required formalities of irrigation enquiry or countersignatures of the Deputy Commissioner of the District as the case may be in accordance with the rules in force and obtaining competent administrative and technical sanction. The execution is carried out either on contract basis or on piecework system depending upon the requirements of each project, and in some cases the work is executed departmentally. Thereafter the Revenue Department takes over these tanks after obtaining a completion certificate from the Public Works Department.

4. As tanks are built in series, defects in the construction of any one of the tanks jeopardise the safety of other tanks even though these may have received attention in the manner mentioned above. It is imperative that the Investigation Unit should inspect all the tanks in the series as far as possible and bring the restoration of such works that require immediate repairs, under the programme.

5. The programmes of work prepared by the Department are reviewed by Block Development Committees and approved after including their suggestions and recommendations. The Committee comprises Members of the Parliament, Members of Legislative Assembly and Council, in that Block with the Revenue Sub-Divisional Officer, who is also the ex-officio Project Executive Officer, as the Chairman. Progress Reports are submitted to the Development Coordination Committee of the District.

6. The Government of India have given a special grant to implement the Special Minor Irrigation Scheme. The programme for the period December 1957 to end of November, 1959 has been examined (Appendix II) and it is observed that out of 2,067 works as many as 578 are pick-up-weirs across valleys where the flow is such as to ensure production of an irrigated crop. Their advantage is that works can be completed in one season and water utilized in the small areas commanded in full the same year. These works are taken up only after it is ascertained that there is steady supply of water.

7. Increased agricultural production is *sine qua non* at present and as such the determination of the priorities should be guided by this objective. It has been found from the various types of works in the different regions of this State that under lift irrigation schemes, there has been a rapid utilisation of water for this purpose as also in the case of the pick-up anicuts across the streams and minor valleys. Under lift irrigation, with the extension of power facilities, individuals are already utilising power for well irrigation. This can be augmented greatly by installing bigger units and commanding larger areas for which there is great scope and demand, particularly in South Kanara and Coorg Districts. Such development of cultivation to a large extent is also possible along the banks of rivers like Tunga. The Team, therefore, recommends that this class of works may receive top priority.

8. The Team is also of the view that there is a considerable scope for release of large extent of lands from the tanks, which are obviously very fertile and will be taken up by cultivators with avidity for raising different crops. The Investigation Units may take up this work and initiate large number of such projects in regions where this is practicable.

9. The priorities mentioned above should not in any way detract from the importance that is attached to restoration works which are essential for maintaining the present level of production.

10. The Revenue Officials are required to carry out inspections according to a definite programme approved by the Deputy Commissioner. This is to ensure :

(*a*) that all major tanks and restored minor tanks are inspected by the Amildar or Sub-Divisional Officer at least once in two years; and

(*b*) that at least fifty tanks are inspected in the course of the year by these officers.

The inspections have to be carried out between the months of October and January and repeated before April so as to ensure that all the defects noticed in the course of the initial inspection are attended to and that the annual repairs are satisfactorily completed. The Executive Engineers and Officers in charge of Sub-Divisions should mutually arrange to inspect, according to a definite programme, all major tanks in their charge in the course of two years.

11. The responsibility for maintenance of tanks, whether major or minor, rests with the ryots and the duty of enforcing this responsibility devolves upon the Revenue Department. The owners of lands of all categories either dry or wet, and all others deriving any benefit whatever from the tank, either directly or indirectly are responsible for maintenance and

upkeep of restored tanks. The obligation of the villagers in this connection has been defined in the rules framed as far back as in 1886 and reiterated from time to time in 1904, 1914, 1915, 1919, 1922 and 1924. This has been incorporated to a certain extent in the Irrigation Act passed in 1952 (Appendix XII).

12. The duties of the beneficiaries are confined to earth work, filling in scours and gullies on the slopes, bringing the top of the bund to the standard which is marked out by the guard stones fixed on the top of the bund, maintain turfing, removing rank vegetation and clearing of supply channels, whereas repairs to masonry of waste weirs, irrigation sluices, stone revetment are to be carried out by the Public Works Department. Even at present certain important major irrigation works are being maintained by the Public Works Department. The old anicuts and channels are receiving attention every year. Special maintenance establishment has been employed for which expenditure is met from Irrigation Cess Fund. In these cases the Department prepares the estimates in advance covering any emergent repairs, silt clearance of the irrigation channels, the charges of the pay for the temporary establishment such as Sowdies (Laskars) etc. The works are kept in working condition so that regular supplies of water are maintained and crops do not suffer except under drought conditions.

13. According to the Act of 1911, Tank Panchayats were constituted which have control over inspection and maintenance of tanks so that the obligations of the villagers could be vigorously enforced. *Out of 103 Tank Panchayats so far formed, as many as 65 are reported to be not working satisfactorily and the question of their abolition is under consideration.

Some of these tanks are in a neglected condition (*vide* Case Studies, Appendix I). For repairing such tanks, the ryots share in the repairs expenses was limited to only one year's revenue, the rest being borne by the Government. It is, however, within the discretion of the Deputy Commissioner to fix the proportion of the cost to be recovered from them. Despite the concessions shown from time to time by reducing the burden on the beneficiaries, the villagers have not carried out the maintenance works at all. Inspection of a number of cases, however, shows that to obtain a priority for their own tank the ryots have come forward voluntarily to pay towards the cost of restoration in the shape of acreage contribution.

14. At the Regional Minor Irrigation Conference held at Hyderabad in July 1958, the Minister for Food and Agriculture, observed that the funds allotted for Minor Irrigation Works should be utilised for maintenance of the existing tanks and for renovation of the obsolete tanks, before any new projects are undertaken. He, further, stressed the necessity of execution of minor works by the local people who may be given financial assistance by the State. At the same Conference, the representatives of the Mysore Government urged that all the works be executed by the Public Works Department. With a view to implement the suggestions, the State Government propose to start a non-lapsable fund to reorient the functions of the Taluk Board and Panchayats by levying an acreage cess not exceeding Rupees five per annum from the beneficiaries in lieu of their obligatory duties towards maintenance of the tanks.

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* Mysore Government's Administration Report for 1954-55.

15. It is, therefore, suggested that in each Taluk specific zones depending upon the number of works should be marked out, lists prepared and the inspection every year by the subordinate, whose jurisdiction covers that zone, insisted. A ledger in the form indicated below needs to be maintained so that there will be a continuous record of each tank indicating also the nature of work carried out year by year. To watch the anticipated benefits under each project, such a record correctly maintained year by year would provide useful data.

Name of the work .. .. ..

Hobli-village-sub series serial No. .

Bund—Earth work .. .. ..
Turfing .. .. ..
Revetment . .. ..

Sluices—Masonry .. ..
Plug and rod .. .. ..
(inlet arrangement) .. ..
Whether leaky or water-tight ?

Waste Weir—Body Wall .. ..
Apron .. .. ..
Toe Wall .. .. .

Any special improvements effected such as opening of a feeder, restoration etc. .. .. ..

Cost of estimate .. ..

Date of sanction .. ..

Acreage benefitted

Increase in acreage due to improvements

The details of surplus over the weir depth and number of days.

Date of inspection by the higher officers.

CHAPTER IV

DESIGNS AND SPECIFICATIONS

From the case study conducted on eleven tanks selected at random, it is seen that 8 tanks have suffered breaches in their life time—one of them as much as five times. In all, 12 breaches were detected. They are attributed to the following causes :—

	No. of Breaches
(*a*) Over-topping of bund	3
(*b*) Piping through bund	4
(*c*) Erosion of bund due to cattle trespass etc.	1
(*d*) Reasons not on record	4
	12

Thus ignoring (d) for which no recorded reasons are available and considering only the 8 cases of breach at (a), (b) and (c), it is seen that about 40% breaches occur due to over-topping, 50% by piping and about 10% by erosion of bund due to cattle trespass etc. Piping and erosion of bund are matters controlled by design, construction and maintenance of bund, whereas over-topping is controlled by adequacy of spillway capacity.

2. It may be noticed from Statement I, that the side slopes of the bunds are pretty steep—as much as 1 : 1 and 1½ : 1. The water side slopes are steeper than the rearside, whereas they need to be otherwise to resist slipping tendency of water face due to draw-down forces. Also steep water side slopes render the pitching unstable.

Similarly top widths range from 3′ to 66′. Some standard widths may be prescribed for all new tanks, which may be about 8 . This would ensure adequate bund width and avoid excessive provisions as is the case in a number of tanks. Bunds of large tanks may need remodelling on these lines which could be done in conjunction with desilting, utilising the excavated material.

Sometimes public roads run over these tanks, which are many times zig-zag in alignment, resulting in frequent accidents to fast moving traffic; vehicles plunge into water causing loss of life and property. In such cases the roads need to be aligned on straight berms instead of top of bunds. This would also save in the earth work for the bund.

3. The waste weir capacities of the tanks are analysed for adequacy against flood discharge as per Inglis formula (*vide* Statement II). Most tanks suffer from inadequate spillway capacity. Even recently built tank like Sangenahalli, with 300 Sq. miles catchment and 51′ high bund, does not seem to have been provided with adequate spillway capacity. Therefore, it is recommended that the question of spillway provision is seriously gone into so far as new tank projects are concerned, and steps may be taken to increase the capacities suitably in the case of old major tanks.*

*This has also been recommended by the Minor Irrigation Committee appointed by the Food & Agriculture Ministry *vide* their Report (Report of the Minor Irrigation Committee, 1957) Recommendation 4 on page 8.

It is desirable to adopt the modern methods like unit hydrograph, to arrive at the design flood in each case.

4. A special reference has to be made in regard to earth work to bund. All estimates provide for "earth work to bund including watering and consolidation." A satisfactory completion of this item ensures better basis for further annual maintenance. The specification provides for hand-tamping and the rate is accordingly fixed in the schedule for this item. If Mechanical devices run on diesel oil and easily handled by one or two men are adopted, better quality work would result, which would not be liable to rapid deterioration as in the case of hand-tamping. Improved results can be obtained if this work is executed departmentally either by hand-tamping or with mechanical devices. The rate to be given to the contractor is to be modified as "earth work to bund", watering and consolidation to be done by departmental agency. Before mechanical tamping is introduced, it needs to be tried on a number of works in each district to test its practicabilty as local conditions vary from area to area.

5. In a number of works in progress the stone revetment lags behind earth work. For this reason, the earth work slopes get scoured and the work done later in making up slopes for the stone work, will not be satisfactory. The specification needs to be rigidly enforced, stipulating that the revetment work should not be more than 1′ to 1½′ below the earth work.

6. The specifications provide turfing for rear slope and front slope above the top of revetment which is made 2 : 1. From the inspection of several works in progress, it has been observed that this essential protective work against scouring of the soil from the side slopes *viz.*, turfing, cannot be done in as satisfactory a manner as is necessary, with all the care contractor and Department bestow on it. This item of turfing is generally reserved to be done at the last stage and the cost thereof forms a minor portion of the estimate. The rate in the schedule also is inadequate for the proper execution of this item. This work, therefore, very often remains undone for more than one rainy season, leading to formation of gullies in slopes and to delays in completion of work.

7. Where stone is readily available, it is essential that pitching should also be provided to the rear slope instead of turfing as per existing specifications. In place of turfing on the front slope above the maximum water level, the revetment may be continued right to the top of the bund. Where stones are not available at economic cost, particular attention may be paid both with regard to selection of grass and its being planted on the slope and attended to till it takes root. The excess due to a suitable enhancement in the rate, will be insignificant while the protection given to the slopes will be more lasting than at present. Earth for the formation of bund in restoration works, is generally obtained from the borrow areas in the tank bed. With this soil, the hard surface on the top cannot be secured and as a consequence it will be liable to erosion. A separate item providing for gravelling the top needs to be provided in the estimate, as a rule.

8. The Team feels that adoption of the above suggestions in restoration works or new tank works will keep the tank bunds free from rapid deterioration they are subject to at present. In the long run, savings under maintenance and the indirect loss will more than outweigh the additional expenditure that may have to be incurred in the first instance.

9. Maintenance works not being carried out properly result in constant leaks in sluices, and also are responsible for breaches. Lack of proper junction of the earth with the pipe or the masonry barrel is a common cause for this defect. It is, therefore, suggested that a provision of one foot thick well kneaded puddle casing may prove a preventive against such leaks. Although this modification involves extra cost, the same will be compensated by effective working, thereby reducing maintenance charges.

STATEMENT 1

Study of bund details

S.No.	Name of Tank	Maximum Height of bund	Top width of bund	Slopes of bund		Number of breaches due to			
				Front	Rear	Over-topping	Piping	Erosion of bund	Unrecorded reasons
1	2	3	4	5	6	7	8	9	10
1	Bekka Amanikere	15′	8′-10′	1½ : 1	2 : 1	—	—	—	1
2	Dyavanur kere	8′	6′- 8′	1½ : 1	2 : 1	1	—	—	—
3	Hanigal Doddakere	35′	9′	1½ : 1	2 : 1	—	—	—	1
4	Baragur Sulekatte	20′	—	1 : 1	2½ : 1	—	—	1	—
5	Baragur Kurumatti Katte ..	6′	3′	1 : 1	2 : 1	—	—	—	—
6	Baragur Kadremane katte ..	18′	6′	1 : 1	2 : 1	—	—	—	1
7	Baragur Goni katte	12′	9′	1 : 1	2 : 1	—	—	—	—
8	Halekote Amani Doddakere ..	40′	3′- 5′	1 : 1	1½ : 1	2	3	—	—
9	Bhima Samudra Tank	35′	25′-63′	1 : 1	1 : 1	—	1	—	—
10	Sangenahalli Tank	51′	10′	1½ : 1	2 : 1 & 3 : 1	—	—	—	1
11	Anjanapur Tank	66′	20′-24′	1½ : 1	2 : 1	—	—	—	—
	Totals					3	4	1	4

STATEMENT II

Study of waste weir capacities

S. No.	Name of Tank	Catchment area = A (Sq. miles)	Length of of waste weir = L	Maximum Flood as per Inglis = Q* (Cusecs)	Height of flood lift = $\left[\frac{Q}{3{\cdot}1 \times L}\right]^{\frac{2}{3}}$	Free board from crest of of W.W.	Free board above maximum flood level (7) - (6)	**Increase in Height of bund required to give 3 free board.
1	2	3	4	5	6	7	8	9
1	Bekka Amanikere	3·74	253′	9,400	5·25′	5′	— 0·25′	3·25
2	Dyavanur Kere	2·72	187′	7,340	5·45′	5′	— 0·45′	3·45
3	Hanigal Doddakere	4·00	83′	9,940	11·4′	5′	— 6·4′	9·4
4	Baragur Sulekatte	0·20	28′	684	3·9′	5′	+ 1·1′	1·9
5	Baragur Kurumatti Katte	0·20		684		1′		
6	Baragur Kadremane Katte ..	0·21	30′	717	3·9′	3′	— 0·9′	3·9
7	Baragur Goni Katte	0·70	37′	2,225	7·25′	2′	— 5·25′	8·25
8	Halekote Amani Doddakere ..	96·00	570′	67.200	11·2′	3′ to 5′	— 8·2 to 6·2′	11·2 to 9·2
9	Bhima Samudra Tank		145′			4½′		
10	Sangenahalli Tank	300·00	400′	120,500	21·1	8′ (Original)	— 13·1′	16·1 †
						16′(on lowering W.W. Cill)	— 5·1′	8·1
11	Anjanapur Tank	201·00	885	98,400	11·0	8′	— 3′	6

*$Q = 7000A/\sqrt{(A+4)}$

**Alternatively, wasteweir length could be widened also.

†Assumption made here is that the 150′ wide tail channel is capable of discharging 120,000 cusecs without submerging the horse-shoe weir. Otherwise the deficiency in the waste weir capacity would be much more than what is indicated here.

CHAPTER V

METHODS OF EXECUTION

The policy of the Government regarding Minor Irrigation works is that these works should be executed by the local people themselves, as the tanks are located near the villages, and the benefits too accrue to the community. The powers of the Executive Engineer have been enhanced recently whereby he has the option to arrange for execution of special Minor Irrigation Works through any agency he may deem fit. Although tenders are called for and preference is given to the local people, yet the response from them is poor. The same is the case with contractors who generally do not come forward to undertake such small works located in the interior, as local labour do not evince any interest in working under them.

2. In view of these handicaps the progress so far attained has not been appreciable. It is, therefore, necessary that Special Wing in the Public Works Department be set up so that concentrated efforts are made for regular inspection, maintenance and timely execution of all minor irrigation works in the State. The officers concerned should inculcate enthusiasm and confidence among the villagers and their Headmen or Sarpanch to come forward to take up such works on contract basis. The Department should also make prompt payments for the works executed and grant advances where necessary.

3. To attract contractors, it is desirable that contracts costing Rs. 50,000 to Rs. 1,00,000 should be given by grouping the tanks within a reasonable distance from one another. This method will eliminate inexperienced contractors from getting works and will induce contracting firms having finance and equipment and command of labour, to come forward. Tangible results can only be achieved if an extensive programme of work is undertaken with the objective of restoring all the tanks in a region in a period of ten years.

4. The Bombay State have introduced a Special procedure called the "Open Schedule Rates" and followed it successfully on the Ghataprabha Project. Thsi procedure is also being followed, to a certain extent, in Mysore State on a few large works carried out departmentally. The Team is of the opinion that the same procedure may also be adopted for execution of Minor Irrigation Works.

5. The Team considers that maximum care be taken at the time of preparation of the projects. The Investigation Division may ensure that the investigations are thorough and estimates are realistic and foolproof, so that necessity for subsequent deviations from sanctioned alignments and designs is minimised as far as possible. This can be achieved only by regular supervision by the Department while works are in progress and difficulties, if any, which may arise during execution of the works, are settled at the site.

CHAPTER VI

DESILTING-CUM-RECLAMATION SCHEME

The Team has suggested a method whereby Desilting-*cum*-Reclamation Scheme can be made partly self-supporting in financial terms. The recommendation is to sell the reclaimed land wherever it belongs to the Government. The returns thus obtained may be utilised towards taking up similar scheme on other tanks. The Scheme was discussed with the Mysore Government Officials in detail on the 16th February 1959, who agreed to take it up on an experimental basis.* Accordingly, work was started on Hebbal Tank on the 5th April 1959 and on Sulebele Tank on the 13th April 1959.

2. Hebbal Tank is situated along Bangalore—Bellary Road in the fifth mile. It has a capacity of 107 units with a water spread of 180 acres and an atchket of 169 acres. The extent of water spread is quite disproportionate to the atchket. Hence it lends itself for decreasing the tank bed area by putting a jack bund and to release the present shallow area on the foreshore for cultivation after raising. The earth required for putting the jack bund and raising the foreshore land is proposed to be obtained by desilting the tank bed. By putting a jack bund along the foreshore in 48.00 contour, it is possible to release by the end of August 1959 an extent of 34 acres of land excluding the area occupied by the jack bund. The quantity of earth required by the jack bund and to raise the foreshore land is estimated to be 75147 c.yds. which can be obtained by desilting the bed and consequently increased the capacity of the tank by about 7.76 units. The jack bund formed out of the desilted earth will have a slope of 2 to 1 both in front and rear. It will be turfed further. The work is being carried out by manual labour and carts. The cost of the scheme is estimated to be Rs. 60,000. The area released for cultivation (*vide* map on the opposite page) lies adjacent to the Agricultural College at Hebbal on the right flank and to the Military Dairy Farm on the left flank. The Agricultural College requires these lands for developing their own activities. The investment per acre on the land released is estimated at Rs. 1,765 and it is ascertained that the fore-shore land raised and levelled with the earth excavated from the tank-bed is worth Rs. 4000 to 5000 per acre. Loss of water as a result of evaporation will also be reduced by restricting the water-spread to 80% of the original area.

3. Sulebele Tank is a major tank with an atchket of 432 acres and the tank is situated at a distance of 24 miles from Bangalore on Hoskote—Sulebele—Sidlaghatta Road. Present capacity of the tank is 26.50 units against original capacity of 74 units. The tank is heavily silted up and there has been a great demand for restoration of this tank to the original capacity. The work has been taken up to increase the capacity of the tank by raising the weir

(*i*) by two feet to 52.00 contour;

(*ii*) restricting the water spread area from 115 acres to 70 acres within 49.00 contour by putting up a jack bund alround the water spread; and

*Appendices II & III of the Interim Report published in April 1959 refer.

(*iii*) releasing the area of 39 acres of water spread for cultivation by raising the foreshore land to R.L. 51.50 using earth from the tank bed. This will reduce the loss of evaporation as the water spread will be only 2/3rd of original area.

The capacity of the tank within the jack bund line at 52.00 contour will be 44.25 units. In addition, capacity gets increased by 17.00 units by desilting. This desilted earth is made use of for jack bund, raising the reclaimed lands and raising and strengthening the main bund. The total quantity of earth got by desilting will be 165,000 c. yds., of this 43,000 c.yds. will be used for putting up the jack bund, 46,000 c. yds. for strengthening and raising the main tank bund and the remaining quantity of 76,000 c.yds. for raising the foreshore land of 39 acres proposed to be reclaimed (*vide* map on the opposite page) by the end of February 1960 and released for cultivation. Thus capacity of 52.00 contour within the jack bund will be 61.25 units. By the present proposal, it is expected that the tank will ensure water supply to the existing atchket of 432 acres. There are about 400 irrigation wells in the area, the yield from which will very much improve after restoration. Cost of restoration works out to Rs. 283 per acre of atchket. Amount realised by way of contribution is 432 × 150=Rs. 64,800. Net cost is Rs. 63,700 which works out to a little more than Rs. 1,500 per acre of reclaimed land. On local enquiry the cost of land per acre in the vicinity is said to be Rs. 8 to 10 thousand as potato and other commercial crops are grown in this area and the reclaimed lands are very fertile.

4. Programme of the experimental scheme is as under :—

A. HEBBAL TANK

I. *Survey and constructive details* :

Basin	*Pennar*
Drainage area (Total)	14·09 sq. miles
Area of water spread at 50 00 contour	180 acres
Total Irrigable area	163 acres
Length of weir	90 feet.
R. L. of weir	50·00 contour
R.L. of bund	55·00 to 56·00 contour
R.L. of sluice	42·00 contour

II. *Details of proposals for land reclamation by desilting*

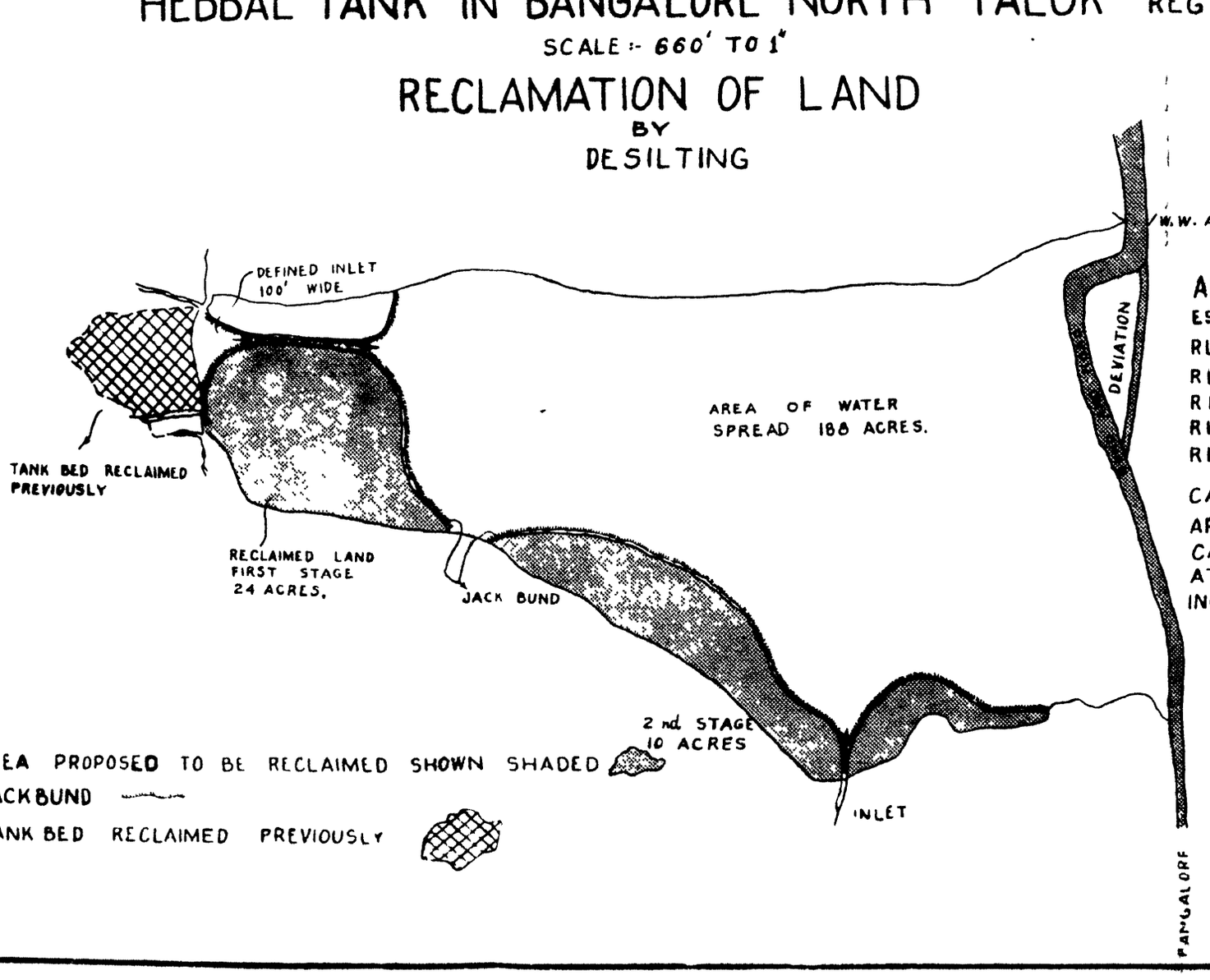
Level (contour)	Water spread in acres	Capacity between contours
50·00	180	—
49·00	154	27·83 units
48·00	141	24·60 units

Capacity between 48·00 and 50·00 contour	52·43 units
Area between 50·00 contour and proposed jack bund line	32 acres
Area of water spread at proposed jack bund line	148 acres
Capacity between 48·00 and 50·00 within jack bund line	48·16 units
Capacity lost on account of putting the jack bund	4·27 units
Approximate length of jack bund	8300 Rft.
Area covered by jack bund	6 acres
Net area available for reclamation	32—6=26 acres

HEBBAL TANK IN BANGALORE NORTH TALUK REG No 46

SCALE :- 660' TO 1"

RECLAMATION OF LAND BY DESILTING



AREA PROPOSED TO BE RECLAIMED SHOWN SHADED

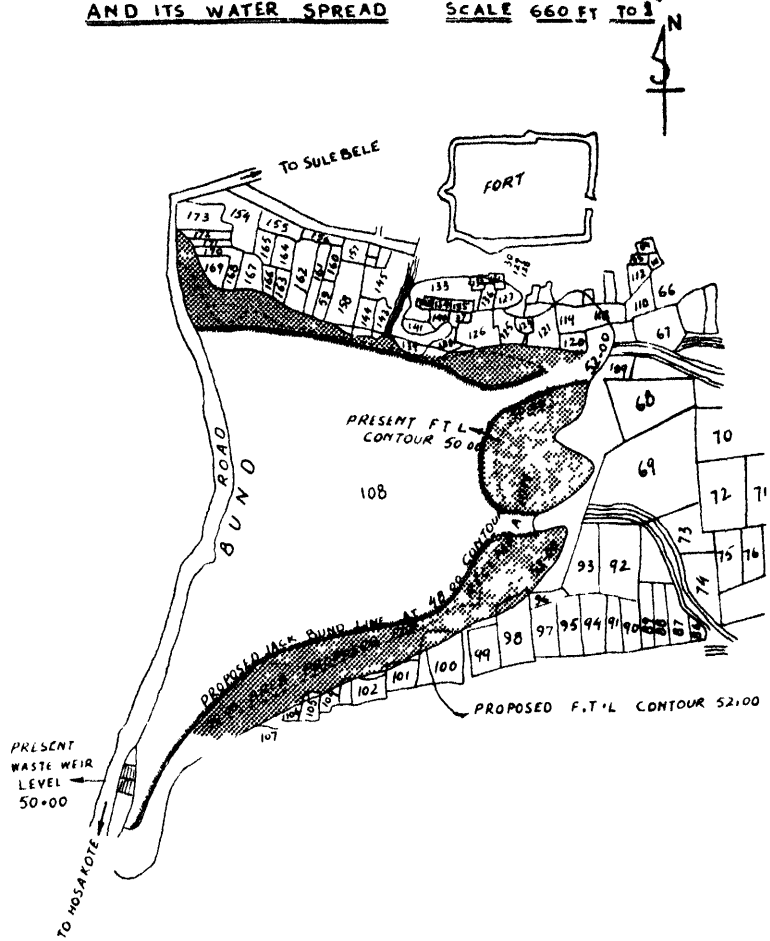
JACK BUND

TANK BED RECLAIMED PREVIOUSLY

SALIENT FEATURES

AREA OF RECLAIMED LAND	34 Ac
ESTIMATED COST	Rs 60,000/-
RL OF JACK BUND	55.00
RL OF RECLAIMED LAND	49.50 TO 50.00
RL OF WEIR	50.00
RL OF BED AT JACK BUND	48.00
RL OF SUICES	42.00
CATCHMENT AREA	5.51 + 8.58 = 14.09 sq. miles.
AREA OF WATER SPREAD	188 Ac.
CAPACITY	182 units
ATCHKUT UNDER TANK	167 Ac.
INCREASE IN CAPACITY	2.49 units.

EXTRACT FROM REVENUE SURVEY MAP SHOWING SULEBELE CHIKKERE AND ITS WATER SPREAD SCALE 660 FT TO 1"



INDEX

- JACK BUND
- AREA RECLAIMED

SALIENT FEATURES

COST OF PROJECT 1·225 LAKHS

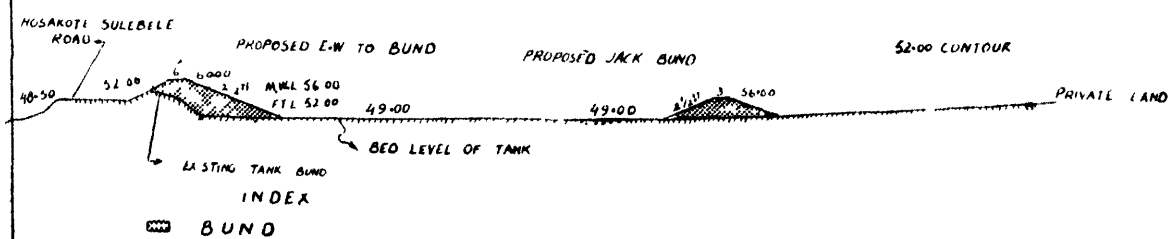
AREA RECLAIMED 39 ACRES

RL OF MAIN BUND 60·00
FRONT SLOPE 2½ TO 1
REAR SLOPE 2 TO 1

R L OF JACK BUND TOP 56·0
FRONT AND REAR SLOPE 2½ TO 1
RL OF BED AT JACK BUND 49·00

FTL OF WASTE WEIR 52·00
(RAISED BY 2')
ORIGINAL CAPACITY 74 UNITS
PRESENT " 26·5 "
CAPACITY RESTORED TO 61·25 "
ATCHKUT UNDER THE TANK 432 ACRES

TYPICAL SECTION OF JACK BUND & FORESHORE AREA



Add tank bed area beyond 50·00 which is already Govt. land and is now proposed to be released	8 acres
Total area available for being released for cultivation	34 acres
Quantity of earth required for jack bund	33,200 c.yds.
Quantity of earth required for levelling the foreshore land ..	41,947 ,,
Total quantity of earth to be desilted	75, 147 cyds. or 7·76 units.

B. SULEBELE TANK

I. *Survey details*

Main river drainage	SOUTH PENNAR RIVER
Drainage area exclusive of tanks above	1·45 sq. miles
Drainage area inclusive of tanks above	18·68 sq. miles
Area of waterspread at 49·00 contour	76 acres
Area of waterspread at 52·00 contour	123 acres
Area of water-spread restricted by jack bund	65·50 acres
Capacity at 50·00 contour	26·50 units
Capacity at 52·00 contour	61·25 units
Number of tanks above	4
Number of tanks below	1
Atchket	432 acres

II. *Construction details*

Length of the weir	185 ft.
Length of the proposed weir	185 ft.
R. L. of present weir	50·00 contour
R.L. of proposed weir	52·00 contour
R.L. of present bund	53·00—54·00 contour
R.L. of proposed bund	60.00 contour
Front slope	2½ to 1
Rear slope	2 to 1
R.L. of sluice No. 1	43·00 contour
R.L. of sluice No. 2	43·00 contour
Length of jack bund	7000 ft.
Earth work to jack bund	42,778 cyds.
Earth work for raising foreshore	76,633 cyds.
Earth work for tank bund	45,333 cyds.

5. The Members of the Irrigation and Power Team visited the sites on 20th June 1959 to see the progress of experiments. Their observations are given in Appendix XIII.

6. Wooden wheel barrows* for transporting silt may be tried in these operations and, wherever tanks are of large size, temporary wooden rails also may be used. Use of other improved implements such as mould board plough for digging the silt and soil scoop for carrying silt is also possible.

7. In view of the progress so far achieved, it is desired that the Desilting-*cum*-Reclamation Scheme may be implemented according to a phased programme for restoration of tanks in large numbers. In fact, these could as well be an important part of the irrigation schemes in the Third Five Year Plan.

*Para 22 of Report of the Indian Delegation to China for study of Irrigation and Water Conservancy Projects during February, 1959.

CHAPTER VII

BETTERMENT LEVY AND WATER RATE

The Mysore Betterment Levy Act 1957 extends to the whole of the State of Mysore. According to this, the contribution to be levied shall in no case exceed Rs. 500 per acre depending on the difference in value of land before and after the completion of irrigation works. According to the provisions of the Act—Clause 4(2) "the Collector shall invite objections and suggestions in such manner as may be prescribed, from the persons liable to pay the same" before determining the contribution payable. The Executive Engineer after preparation of estimate suggests a rate for contribution and also for water rate so that in normal cases the return may be not less than 2% on the Government share (Appendix XIV). The Deputy Commissioner proceeds on this basis and determines the same after necessary enquiries.

2. As the recovery is made in a number of annual instalments the beneficiaries do not hesitate to accept what is proposed by the Deputy Commissioner. Their willingness to bear this burden is due to their anxiety to have their tank put into proper condition. The psychology of ownership has a great deal to do with this attitude. The recoveries are made in suitable annual instalments as may be fixed. While they may be slow they are nevertheless done as is seen from an extract of the Administration Report for the year 1952-53 and 1954-55 for Anjanapur Reservoir Works, *vide* Appendix XV.

3. The Team does not consider it necessary to introduce further changes in the present procedure which has been adopted a couple of years ago.

11th August, 1959.

N. V. GADGIL
Leader

*SUMMARY OF RECOMMENDATIONS

The Team recommends that Tank Registers should be scrutinised afresh and brought up-to-date by the Investigation Unit and printed. Priority should be given to the printing of Serial Registers. Simultaneously, action may also be taken to compile such statistics in respect of areas which have been newly added as a result of re-organisation of States.

2. The following measures are necessary to bring about effective conservation, augmentation and economic utilisation of water resources :—

(i) Investigations may be conducted to build new tanks upstream so as to command areas lower down and to supplement the storage lost by siltage;

(ii) New tanks may also be built lower down and the existing tanks repaired to serve as silt arresters ;

(iii) Preventive measures may be taken to arrest silting by construction of silt traps along the valleys and to conserve soil in the catchment area and in the foreshore lands of the tanks;

(iv) Wells may be sunk in the atchkets to supplement supplies from tanks ;

(v) Drainage channels may be provided to prevent and recover water-logged areas wherever necessary;

(vi) The leaky sluices may be repaired to prevent wastage of water from tanks ;

(vii) Water requirements of plants in field condition may be studied on a regional basis.

(viii) Simple and cheap instruments may be introduced to measure water supply for irrigation, as measured supply ensures optimum utilisation and maximum return.

(ix) Additional power may be provided to facilitate installation of pumps in larger numbers.

3. When tanks are built in series, defects/breaches in any one of the tanks jeopardise the safety of the other tanks. It is, therefore, imperative that the Investigation Unit should inspect all the tanks in the series and bring the restoration of such works that require immediate repairs, under the programme of works.

4. There is considerable scope for the release from the tanks of large extents of land, which are obviously very fertile and will be taken up eagerly by cultivators for raising different crops. The Investigation Unit may take up this work and initiate large number of such projects in regions wherever this is practicable.

5. In order to avoid loss of water if villagers default in maintaining tanks, the Team commends the proposal of the Mysore Government to have all the works, including maintenance, executed by the Public Works Department and to start a non-lapsable fund to reorient the functions of the Taluk

*These recommondations are in addition to those already included in the Interim Report published in April 1959.

Boards and Panchayats by levying an acreage cess, not exceeding Rupees five per annum from the beneficiaries in lieu of their obligatory duties towards maintenance of tanks.

6. The Team suggests that in each Taluk, specific zones depending upon the number of works, should be marked out, lists prepared and the inspection reports recorded every year by the subordinates in charge of that zone.

7. It is recommended that spillways should be carefully designed on modern principles of unit hydrograph methods etc. so as to avoid damages to the earthen bunds. The present capacities as provided are on the low side, generally.

8. The side slopes of tank bunds as obtaining on most of the tanks are steep and the water-side slopes are generally steeper than the rear slopes whereas it should be the reverse. Similarly, the top widths vary considerably—from 3′ to 66′. Standard top widths graded according to the height of bunds with a minimum of about eight feet may be prescribed. The public roads running above the bunds with zig-zag alignments need to be provided on straight berms to avoid accidents to fast moving traffic. Such remodelling as may be necessary on important Tanks, may be executed in conjunction with desilting operations, utilising the excavated material.

9. The specification provides for hand-tamping for earth work to bund. If mechanical devices run on diesel oil and easily handled by one or two men are adopted, better quality work would result if executed departmentally. This would not be liable to rapid deterioration as in the case of hand-tamping. However, before mechanical tamping is introduced it needs to be tried on a number of works in each district to test its efficacy and practicability as local conditions differ from area to area.

10. It is essential that stone-pitching up to rear flood level instead of turfing be provided to the rear slopes, wherever stone is available in close proximity.

11. It is suggested that provision of one foot thick well kneaded puddle casing may prove a good preventive against leaks in sluices and avoid breaches. Though this modification involves extra cost, the same will be compensated by effective working, thereby reducing maintenance charges.

12. The Team proposes that a Special Wing in the Public Works Department may be set up so that concerted efforts are made for regular inspection, maintenance and timely execution of all minor irrigation works in the State.

13. In view of the results of the experiment so far conducted, the Team suggests that the Scheme of Desilting-*cum*-Reclamation may be implemented according to a phased programme for the restoration of large number of tanks in the State forming an integral part of the Irrigation Schemes in the Third Five Year Plan.

14. The present procedure for betterment levy and water rate was adopted by the State only in 1957. The Team feels that the system being recently introduced needs no further changes at this stage.

APPENDICES

I. Irrigation Statistics for the period 1945-46 to 1956-57 and Case Studies.

II. Abstract programme of the State for the period December 1957 to end of March 1959.

III-A. Sample Serial Register of Tanks in the Krishna Basin.

III-B. Sample Sheet-Serial Register of Tanks in the Pallar Basin.

IV. Mc Hutchin's Table.

V. Sample Sheet—Taluk Register.

VI. Extracts of Rules defining the limits within which no new irrigation works are to be constructed by the Mysore State without previous reference to the Madras Government—1892.

VII. Experiments regarding soil erosion.

VIII. Statement showing abstract of tanks whose water spread is more than the atchket.

IX. Experiments regarding evaporation losses.

X. Evaporation losses in inches at various stations in Mysore State.

XI. Proposals for minor irrigation schemes in Coorg District for three years from 1959-60 to 1962-63.

XII. The Mysore Irrigation Act, 1932 (as amended by Acts VII of 1938 and VII of 1952.).

XIII. Observations of the Irrigation and Power Team on the Desilting-*cum*-Reclamation experiments being conducted on Hebbal and Sulebele Tanks.

XIV. The Mysore Irrigation (Levy of Betterment Contribution and Water Rate) Act, 1957.

XV. Extract of the Administration Report for the year 1952-53 and 1954-55 for Anjanapur Reservoir Works.

XVI. Comments of the Government of Mysore, and the Ministry of Food & Agriculture, Government of India.

APPENDIX I

IRRIGATION STATISTICS FOR THE PERIOD 1945-46 TO 1956-57 AND CASE STUDIES

Information regarding the extent of cultivation under several sources of Irrigation such as Channels, Tanks, Wells and other sources for the years from 1945 to 1957, is given below for the erstwhile State excluding Bellary.

Year	Government Canals	Private	Tanks	Wells	Other sources	Total
	Acres	Acres	Acres	Acres	Acres	Acres
45—46	2,50,140	12,447	5,68,065	1,02,857	1,71,079	11,04,588
46—47			NOT AVAILABLE.			
47—48	2,62,576	2,754	6,10,678	84,995	1,97,363	11,58,966
48—49	2,65,219	4,699	5,82,206	92,114	2,07,422	11,51,660
49—50			NOT AVAILABLE.			
50—51 .	2,71,830	4,547	5,38,964	1,06,546	95,310	10,17,197
51—52	2,81,724	4,176	5,17,886	1,01,185	85,974	9,90,945
52—53 .. .	2,92,857	3,120	5,39,240	1,12,526	1,01,011	10,48,754
—Bellary ..	14,752	..	13,720	7,559	29	36,060
	2,78,105	3,120	5,25,520	1,04,967	1,00,982	10,12,694
53—54	3,06,781	5,704	5,69,708	1,19,913	1,15,382	11,17,488
—Bellary .	17,234	..	12,788	7,828	401	38,248
	2,89,547	5,704	5,56,920	1,12,085	1,14,981	10,79,240
54—55 .. .	3,16,743	5,760	5,69,694	1,21,890	11,350	11,27,437
—Bellary .	19,598	..	11,189	5,335	257	36,379
	2,97,145	5,760	5,58,505	1,16,555	11,093	10,91,058
55—56	3,18,644	3,509	5,75,601	1,25,391	1,42,014	11,65,159
—Bellary ..	18,076	13	14,589	7,483	1,612	41,733
	3,00,568	3,496	5,61,012	1,17,908	1,40,402	11,23,426
56—57 ..	3,35,833	3,572	6,27,321	1,08,389	1,99,985	12,75,100
—Bellary .	22,734	5	17,308	6,116	419	46,580
	3,13,099	3,567	6,100,13	1,02,275	1,99,566	12,28,520

From the above statement it is seen that the increase in the irrigated area from all sources in the period 1945-46 to 1956-57 is 1.24 lakhs of acres. Out of this, the increase under the channels is .62 lakhs.

But the figures for tanks indicate that the maximum cultivation has been 6.1 lakhs which has occurred in the year 47-48 and 56-57. This indicates that the extent of cultivation has been sustained.

CASE STUDIES OF PRESENT CONDITION OF ELEVEN IRRIGATION TANKS SELECTED AT RANDOM IN MYSORE STATE.

1. *Bekka Amanikere*

The bund needs immediate attention as the revetment on the front slope is dislodged in several grades. Ant hills and rat holes are seen in several places on it. There is thick jungle growth of woody perennials on the bund. The gravel casing has been completely eroded and turf has grown over the bund.

2. *Dayavanur Urumundinakere*

There is no gravel casing on the bund. There is revetment only in 4 grades on the front slope to a height of 3 ft. from the tank bed. The sluice situated on the right bank has been completely choked up due to neglect. The bund, said to be put up voluntarily by the villagers without any technical guidance in the year 1939, lacks proper sloping at several grades.

3. *Hanigal Doddakere*

The bund is revetted only up to the central sluice from the right waste weir side. Jungle growth of woody perennials is present on either slopes for about 15 grades.

4. *Baragur Sulekatte*

The bund which had breached and become irregularly flat with the revetment dislodged throughout by about the year 1944, lies unrestored. There is thick jungle growth of woody perennials all over the bund, left uncleared. The tank bed is heavily silted up and is full of weed growth. There are no sluice and masonry waste weir.

5. *Baragur Kurmattikatte*

The bund had become flat and the tank bed is full of weed growth. There are no sluice and masonry waste weir.

6. *Baragur Kadremanekatte*

The bund on the right bank which had breached in the year 1958 still remains to be filled up. There is thick jungle growth of woody perennials on the bund and sluice is leaking.

7. *Baragur Gonikatte*

There are huge trees growing at the rear toe of the bund. Sparse jungle growth of woody shrubs is seen on the bund. Slope of the catchment is falling into the tank near the waste weir on the right bank.

8. *Helekote Amani Doddakere*

There is revetment on the front slope of the bund, only in certain grades (3rd grade = 25 ft. 4th grade = 25 ft., 18th grade = 80 ft. 19th grade = 99 ft. and 20th grade = 80 ft.). There is thick jungle growth of woody perennials in several grades. Several huge trees are also seen on the bund in certain places. There are forty ant-hills on the bund. The bund is scoured in several grades. Repairs to the left waste weir and channel which had breached in the year 1958 are still to be completed.

Protective works of the right waste weir damaged in the year 1958 remain to be repaired. The channels on both the banks require to be desilted.

9. *Bhimasamudra Tank*

There is thick jungle growth of woody shrubs and undertrees at the rear toe of the bund. Out of the three sluices only the central and the left bank sluices are functioning. The central sluice needs locking arrangement and some minor repairs such as providing protective iron railings and slabs or wooden flanks for the foot bridge connecting the head of the sluice and the bund.

10. *Sangenahalli Tank*

Construction of this tank was taken up in 1946 and completed in 1952. A breach had occurred on 28-10-1953 at the gorge portion due to heavy flood. In order to increase the spillway capacity the cill of the waste weir which was at R.L. 2142, had been lowered to R.L. 2134. The free board provided at the first stage of construction was 8 ft., but subsequent to the reduction in the cill of the waste weir it is 16 ft. Reduction in capacity from 1,492 units to 622 units had resulted by reducing the cill of the waste weir by 8 ft. The reconstruction of the breach is nearing completion. The left bank channel is 7½ miles long and is commissioned to service only up to 6½ miles. The remaining one mile length of the channel is still not put to use for want of an aqueduct, which has been proposed to be constructed before March, 1960.

	Rs. Lakhs.
1. Initial estimated cost of construction	10·57
2. Revised cost due to increased schedule of rates during the construction period. (1946—52).	25·00
3. The total increased cost of construction after the tank had breached in October, 1953.	39·96

11. *Anjanapur Tank*

On either slopes of the bund very sparse growth of woody perennial shrubs is emerging which requires immediate eradication.

APPENDIX II.

Abstract of Programme for the Period December 1957 to end of March 1959.

		No. of tanks to be restored	Additional area to be irrigated (acres)	Number of anicuts to be constructed	Additional area to be irrigated (acres)	Other sources such as new channels etc.	Additional area to be irrigated (acres)	Total estimated cost. Rs.
1.	Bangalore Circle	131	3,276	189	3,744	36	1,964	35,76,810
2.	Cauvery Circle	550	8,559	161	3,133	16	687	77,11,372
3.	South Kanara Circle	64	153	22	100	14		14,44,460
4.	Belgaum Circle	303	2,961	101	1,131	20		60,75,661
5.	Raichur Circle	68	3,222	57	1,375	1		23,59,640
6	Shimoga Circle	373	10,890	48	7,208	42	6,098	20,69,990
		1,489	29,061	578	16,691	129	8,749	2,32,37,933

Total additional areas to be brought under Irrigation—acres

Under Tanks	29,061
Under anicuts	16,691
Under other sources ..	8,749
	54,501

APPENDIX III-A

Sample Serial Register of Tanks in the Krishna Basin.

Name of Taluk	Talukwar Number	Name of Village and tenure	Name of tank	Old register number	Sub-Serial number	Serial No.	Names of villages to which atchkat belongs	Atchkat and assessment village by village					
								WET		GARDEN		TOTAL	
								Acres	Rupees	Acres	Rupees	Acres	Rupees
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
		KRISHNA BASIN. SUVARNAMUKHI SERIES. No. 2 or Madlur Sub Series											
Idagiri.	35	Jakkenhalli	Tank	52	27	71	Jakkenhalli	..	..	16	71	16	71
	36	Shivangere Jodi	Halangere	79	28	72	Shivangere	8	40	..	..	8	40
	37	Do.	Honnapian kere	78	29	73	Do.	27	135	10	60	37	195

APPENDIX III—A—(*contd.*)

Atchkat under occupation village by village & revenue derived during 1903-04		Water spread	Maximum depth	Capacity	Drainage area of the tank	If restored, when ? and cost	Condition and remarks
Acres	Rupees	acres	Feet	units	sq. miles		
(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
14	63	16	5¼	7	0·43	Not restored	Bund bad; Sluice Leaky Weir natural.
8	..	20	4½	8	1·06	Do.	Do.
37	..	32	3	8	0·66	Do.	Bund bad; Sluice temporary; weir natural

APPENDIX III-B

Sample Sheet

Serial Register of Tanks in the Pallar basin.

Serial No.	Page No.	Atchket	Water-spread	Capacity	No. of tanks
1	2—3	459	415	200	22
2	4—5	593	557	346	19
3	6—7	609	544	238	30
4	8—9	973	853	643	12
5	10—11..	413	440	194	23
6	12—13..	403	312	192	28
7	14—15..	645	511	367	17
8	16—17	296	291	134	34
9	18—19..	421	258	149	22
10	20—21..	421	336	163	29
11	22—23..	693	562	285	29
12	24—25	603	741	461	35
13	26—27..	431	361	208	29
14	28—29	456	520	420	28
15	30—31..	627	710	468	30
16	32—33	1,028	890	802	28
17	34—35..	650	547	365	22
18	36—37..	1,204	1,237	964	26
19	38—39..	470	519	253	21
20	40—41..	788	844	437	25
21	42—43..	348	348	185	21

Average Rainfall 29 inches.

APPENDIX IV

117. Mc Hutchin's Table

The following table is recommended for computing yield from different classes of catchment areas.

Statement No. 6

Rainfall in inches of wet months	Flat country, porous soil, large areas over 10 sq. miles		Flat or easy rolling country, gravel or clay soil, much ploughed land, casuarina plantation and thick grass & undergrowth		Rolling downs, gravel or clay normal or average. Mysore Maidan cultivation and thin scrub upto 10 sq. miles		Steep rolling downs, gravel and clay or rocky hills with scrub cultivation sparse or short grass or bare ground or areas 2 to 3 sq. miles of nature of colum 3		Hilly country rocky soil or very thin top soil or small catchment under 2 sq. miles of nature col. 4		Hilly and rocky catchment of small areas under 2 sq. miles of nature of col. 6.	
	Percent	Unit	Percent	Unit	Percent	Unit	Percent	Unit	Percent	Unit	Percent	Unit
1	2		3		4		5		6		7	
10	3·5	3·11	3·75	..	4·0	3·56	4·37	.	4·75	4·28	5·75	5·11
11	3·80	3·71	.	..	4·4	.	4·80	.	5·20	..	6·32	..
12	4·1	4·37	.	.	4·8	..	5·22	..	5·65	..	6·89	..
13	4·4	5·08	.	.	5·2	..	5·65	..	6·10	..	7·46	..
14	4·7	5·85	..	.	5·6	.	6·07	..	6·55	..	8·03	..
15	5·0	6·66	5·50	..	6·0	8·00	6·50	..	7·00	9·33	8·60	11·13
16	5·3	7·54	.	..	6·4	.	6·92	.	7·45	..	9·17	..
17	5·6	8·46	..	..	6·8	.	7·35	..	7·90	..	9·74	..
18	5·9	9·44	..	..	7·2	.	7·77	..	8·35	..	10·31	..
19	6·2	10·47	..	..	7·6	..	8·20	..	8·80	..	10·88	..
20	6·5	11·55	7·25	.	8 0	14·22	8·62	15·32	9·25	16·44	11·45	20·44
21	6·8	12·69	7·60	..	8 4	15·68	9·05	17·73	9·70	..	12·02	..
22	7·1	13·88	7·95	..	8·8	..	9·47	..	10·15	..	12·59	..
23	7·4	15·13	8·30	16·97	9·2	18·81	9·90	20·24	10·61	21·67	13·16	26·90
24	7·7	16·43	8·65	18·45	9·6	20·48	10·32	22·02	11·05	23·57	13·73	29·29
25	8·0	17·77	9·00	20·00	10·0	22·22	10·75	23·90	11·50	25·55	14·30	31·66
26	8·33	19·25	9·36	21·72	10·4	24·03	11·18	25·84	11·95	27·67	14·87	34·37
27	8·67	20·80	9·73	23·27	10·8	25·92	11·60	27·80	12·40	29·77	15·44	37·06
28	9·00	22·40	10·09	25·12	11·2	27·88	12·03	29·94	12·85	31·98	16·00	39·82
29	9·33	24·06	10·46	26·96	11·6	29·90	12·45	32·09	13·30	34·28	16·57	42·71
30	9·67	25·78	10·82	28 94	12·0	32·00	12·88	34·34	13·75	36·66	17·14	45·33

APPENDIX IV *contd*

	Percent	Unit	Percent	Unit	Percent	Unit	Percent	Unit	Percent	Unit	Percent	Unit
1	2		3		4		5		6		7	
31	10·00	27·55	11·19	31·03	12·4	34·17	13·30	36·65	14·20	39·13	17·71	48·80
32	10·33	29·38	11·56	33·06	12·8	36·41	13·73	39·35	14·53	41·67	18·28	52·00
33	10·67	31·29	11·95	35·10	13·2	38·72	14·15	41·52	15·10	44·29	18·85	55·29
34	11·00	33·24	12·30	37·13	13·6	41·10	14·58	44·06	15·55	47·00	19·42	59·43
35	11·33	35·26	12·67	39·17	14·0	43·55	15·00	46·66	16·00	49·80	20·20	62·20
36	11·67	37·33	..	..	14·4	46·08	15·43	49·38	16·46	52·67	20·90	65·83
37	12·00	39·47	..	..	14·8	48·68	15·86	52·17	16·93	55·69	21·14	69·53
38	12·33	41·66	..	..	15·2	51·34	16·30	55·06	17·40	58·78	21·70	73·30
39	12·67	43·91	..	..	15·6	54·08	16·73	58·00	17·86	61·92	22·27	77·21
40	13·00	46·22	14·50	..	16·0	56·88	17·17	61·05	18·33	65·38	22·84	81·21
41	13·33	48·60	..	..	16·4	59·77	17·60	64·15	18·80	68·52	23·40	85·28
42	13·67	51·02	.	..	16·8	62·72	18·03	67·02	19·26	71·91	23·97	89·49
43	14·00	53·51	.	..	17·2	65·74	18·46	70·56	19·73	75·42	24·54	93·80
44	14·33	56·05	..	.	17·6	68·84	18·89	73·89	20·20	79·41	25·10	98·78
45	14·67	58·57	16·33	..	18·0	72·00	19·33	77·32	20·60	82·67	25·67	102·67
46	15·03	61·46	..	..	18·4	75·24	19·76	80·80	21·13	86·40	26·24	107·30
47	15·40	64·34	..	..	18·8	78·55	20·20	84·40	21·60	90·24	26·80	111·97
48	15·76	67·24	..	..	19·2	81·92	20·63	88·30	22·06	94·13	27·37	116·78
49	16·13	70·25	..	.	19·6	85·37	21·06	91·73	22·53	98·14	27·94	121·70
50	16·50	73·33	18·25	81·11	20·0	88·88	21·50	95·56	23·00	102·22	28·50	126·69
51	16·85	76·39	18·65	84·55	20·4	92·48	21·95	99·50	23·50	106·53	29·05	131·70
52	17·20	79·50	19·05	88·05	20·8	96·14	22·40	103·54	24·00	110·94	29·60	136·82
53	17·55	82·68	19·45	91·63	21·2	99·88	22·85	107·56	24·50	115·42	30·15	143·04
54	17·90	85·92	19·85	95·28	21·6	103·68	23·30	111·84	25·00	120·00	30·70	147·36
55	18·25	89·22	20·25	99·00	22·0	107·56	23·50	116·12	25·50	124·67	31·25	152·78
56	18·60	92·59	20·65	103·00	22·4	111·51	24·20	120·46	26·00	129·42	31·80	158·30
57	18·95	96·02	21·05	105·66	22·8	115·52	24·65	124·89	26·50	134·27	32·35	163·91
58	19·30	99·50	21·45	110·59	23·2	119·61	25·10	129·41	27·00	139·20	32·90	169·62
59	19·55	108·05	21·85	114·60	23·6	123·77	25·55	133·99	27·50	194·22	33·45	175·43
60	20·00	106·66	22·25	118·67	24·0	128·00	26·00	138·67	28·00	149·34	34·00	181·34

APPENDIX V

Abstract of Statement of Atchket and Waterspreads of tanks of all classes in the Sorab Taluk, Shimoga Distt.

Name of series	No. and name of sub series	Total Government, Private and Inam				Grand total Major & Minor	
		Major		Minor			
		Atchkat	Water spread	Atchkat	Water spread	Atchkat	Water spread
West Coast Upper	No. 1 Tadri	—	—	40	3	40	3
Tungabhadra left Bank	No. 3 or Salur	1,514	244	546	105	2,060	349
Do.	No. 5 or Mugur	5,223	747	4,591	885	9,814	1,632
Do.	No. 6 or Dandavati	10,746	1,585	8,289	1,705	19,035	3,290
Do.	No. 7 or Varada	3,898	583	4,797	668	8,695	1,251
Do.	No. 8 or Jade	4,044	630	2,269	398	6,313	1,028
	TOTAL	25,425	3,789	20,492	3,761	45,917	7,550
	GRAND TOTAL	25,425	3,789	20,532	3,764	45,957	7,553

Annual average rainfall 59 inches.

APPENDIX VI

EXTRACT

RULES DEFINING THE LIMITS WITHIN WHICH NO NEW IRRIGATION WORKS ARE TO BE CONSTRUCTED BY THE MYSORE STATE WITHOUT PREVIOUS REFERENCE TO THE MADRAS GOVERNMENT—1892.

I. In these Rules,

(1) 'New Irrigation Reservoirs' shall mean, and include such Irrigation Reservoirs, or tanks, as have not before existed, or having once existed, have been abandoned and been in disuse for more than 30 years past.

(2) A "New Irrigation Reservoir" fed by an anikat across a stream shall be regarded as a *"New Irrigation Reservoir across"* that stream.

(3) "Repair of Irrigation Reservoirs" shall include (a) increase of the level of waste weirs and other improvements of existing Irrigation Reservoirs or tanks, provided that either the quantity of water to be impounded, or the area to be irrigated, is not more than the quantity previously impounded or the area previously irrigated, by them; and (b) the substitution of a new Irrigation Reservoir for and in supersession of an existing Irrigation Reservoir but in a different situation, or for and in supersession of group of existing Irrigation Reservoirs, provided that the new work either impounds not more than the total quantity of water previously impounded by the superseded works, or irrigates not more than the total area previously irrigated by the superseded works.

(4) Any increase of capacity other than what falls under "Repair of Irrigation Reservoirs" as defined above shall be regarded as a "New Irrigation Reservoir".

II. The Mysore Government, shall not without the previous consent of the Madras Government, or before a decision under Rule 4 below, build (a) any "New Irrigation Reservoirs" across any part of the thirteen main rivers named m the Appended Schedule A, or across any stream named in Schedule B below the point specified in column 5 of the said Schedule B or in any drainage area specified in the said Schedule B or (b) any "New Anikat" across the minor streams of Schedule A. *Viz.*, 4 to 9 and 14 and 15, or across any of the streams of Schedule B, or across the following Major streams of Schedule A, lower than the points specified hereunder :—

Across 1. Tungabhadra—lower than the road crossing at Honhalli

Across 10. Cauvery—lower than the Ramaswami anicut and

Across 13. Kabani—lower than the Rampur anikat.

III. When the Mysore Government desires to construct any "New Irrigation Reservoir" or any "new anikat" requiring the previous consent of the Madras Government under the last preceding Rule, then, full information regarding the proposed work shall be forwarded to the Madras Government and the consent of that Government shall be obtained previous to the actual commencement of the work. The Madras Government shall be bound not to refuse such consent except for the protection of prescriptive

right already acquired and actually existing, the existence, extent, and nature of such right and the mode of exercising it being in every case determined in accordance with the law on the subject of prescriptive right to use of water and in accordance with what is fair and reasonable under all the circumstances of each individual case.

IV. Should there arise a difference of opinion between the Madras and Mysore Governments in any case in which the consent of the former is applied for under the last preceding Rule, the same shall be referred to the final decision either of arbitrators appointed by both Governments or of the Government of India.

V. The consent of the Madras Government is given to New Irrigation Reservoirs specified in the appended Schedule C, with the exception of the Srinivasasagara New Reservoir across the Pennar, the Ramasamudram New Reservoir across the Chitravati, and the Venkatesagara New Reservoir across the Papaghni. Should owing to the omission of the Mysore Government to make or maintain these works in a reasonably adequate standard of safety, Irrigation works in Madras themselves in a condition of reasonably adequate safety be damaged, the Mysore Government shall pay to the Madras Government reasonable compensation for such damage.

As regards the three new Reservoirs excepted above, the admissibility of any compensation from Mysore to Madras on account of loss accruing to Madras Irrigation works from diminution of supply of water caused by the construction of the said works, will be referred to the Government of India whose decision will be accepted as final, and should such compensation be decided to be admissible, the decision of Government of India as to the amount thereof will be accepted after submission of them of the claims of Madras which should be preferred in full detail within a period of five years after the completion of said works.

VI. The foregoing rules shall apply as far as may be to the Madras Government as regards streams flowing through British Territory into Mysore.

APPENDIX VII

EXPERIMENTS REGARDING SOIL EROSION

1. USDA Agricultural Information Bulletin No. 71 page 9 states 'Good forest soils which take water quickly can hold 50% or more of their volume'. This means that besides preventing erosion some forest soils eight feet deep, with high retentive potentiality, may store as much as four feet of water.

2. Two soil conservation experts of Washita Valley, S. G. Archer and C. L. Bunch (*vide* 'The American Grass Book') found that percolation of water into grass land was twenty-two times as fast as movement in the other soil under cultivation.

3. In water Detention Experimental Station at Speer, Texas, it was found that contour plantation of Buffalo grass caused a moisture penetration of seventy-two per cent and a total absorption of 6.67% which was more than three times as great as in the untreated portion, and the measurements were made after a heavy rain-fall.

4. In order to emphasise the urgency of soil conservation the Missourie Agricultural Experimental Station, as a result of detailed study, reported that for removal of 7″ deep soil by erosion, whereas it will require as many as 3043 years if the land is under continuous grass, this much loss can easily take place in 368 years if the field is under crops like corn and wheat, and only one hundred years if it is continuously under wheat and fifty years if continuously under corn, and merely twenty four years if the land is ploughed deep and left over.

5. Experiments conducted over a period of twenty-two years on Red Plain SCS Demonstration Farm at Guthrie, Oklahoma (USA) have shown that Bermuda grass could hold rain water run-off about eight times as much as open tilled ground.

6. In another experiment in the United States of America Bermuda grass gave still better results. It showed its water holding capacity to be twelve times more than that of other crops. The beneficial effect of the grass was continuous over a period of five years. It could not only stand partial submergence but also survive dry period lasting thirteen months.

APPENDIX VIII

Statement showing abstract of Tanks whose water spread is more than Atchkat

Sl. No.	Name of Basin	No of Tanks	Breached & others	Atchkat	Water Spread areas (acres)	No. of tanks whose water spread is more than atchkat	Water spread Area (acres)	Atchkat (acres)
1.	Krishna	7,718	536	283,975	150,441	863	78,309	47,531
2.	Cauvery	9,631	941	267,035	182,638	2,632	80,210	54,679
3.	North Pennar Basin	1,970	75	75,290	64,595	1,096	32,100	21,730
4	South Pennar	1,290	103	52,417	49,640	511	26,251	17,377
5.	Netravati	70	—	621	42	3	4	3
6.	Minor Rivers Basin	167	7	1,378	34	—	—	—
7.	Saravati Basin	1,213	176	17,165	1,148	9	45	37
8.	Palar Basin	1,421	70	46,366	54,072	831	35,656	22,800
		23,480	1,908	744,247	502,610	5,945	252,575	164,157

APPENDIX IX

EXPERIMENTS REGARDING EVAPORATION LOSSES

1. Experiments conducted at Washington Agricultural Experimental Station in the U.S.A. *vide* 'Future of Arid Land' showed that the rate of evaporation from a free water surface is directly related to the quantity of water consumed by a crop in the field.

2. In Oklahoma City two reservoirs covering 4,200 acres were estimated to lose about twenty-five million gallons of water a day by evaporation alone. It means that on the basis of 22,500 gallons per acre per inch irrigation, one day's loss by evaporation from this tank was sufficient to supply a three inch irrigation to an area of about 375 acres.

3. According to 'Water resources—Present and Future Uses' by Frederic Hyanes Newell, in the arid and semi-arid of the West in the United States of America the total evaporation losses for the year in Northern climates (relatively cooler places) are of the order of three to four feet in depth, as against seven to eight feet or more in the Southern parts of the Arid Regions of the United States of America.

4. "Irrigation Engineering" by Lvan Ehouk, Volume Agricultural and Hydraulic Phases page 261 to 269, records results of the annual evaporation losses at some Evaporation Stations in the United States of America. They varied fifty inches in the case of Fall River, California (which is a coastal State) to as high as 117.67" in case of Yuma Citrus (Arizona) which resembles many States in India.

5. An experiment on the use of alcohol compounds was carried out by the United States Bureau of Reclamation and also by South West Research Institute, Texas. Actual tests using monomolecular films on the small reservoirs, according to "The American City" Journal February 1958, showed that savings in the range of thirty to forty percent could be achieved. According to Indian Journal of Power and Irrigation—April 1958, Scientific Notes, recent experiments conducted in East Africa had given encouraging results by using a doze of—cetyl alcohol compound (Kerosine 1 litre, cetyl alcohol—30 gm. and dispersing agent—0.9 gm.) which gave a reduction of twenty to thirty percent. Similar trials on larger water surfaces were undertaken in Tanganyika (East Africa) where on a reservoir of 105 acres, cetyl alcohol solution gave fairly successful results. In Australia also a good deal of experimental work is in progress under Commonwealth Scientific and Industrial Research Organisation (CSIRO) on the elimination or retardation of loss both by evaporation from surface and by percolation in the bed of the tanks and results achieved so far are very encouraging.

6. As regards the cost, Russel G. Dressel Chemical Processing Consultant, Texas, has estimated that reservoir can be coated with fatty alcohol compound one-tenth-millionth of an inch thick at a total cost of 4.52 dollars per acre foot annually. This comes to over Rs. 20 per acre foot, which for Indian conditions is rather a high cost but it presumably includes cost of labour which in the United States of America is comparatively very high.

7. Herbert Addison, formerly Professor of Hydraulic Machines, Foud University, Egypt, in his book 'Land, Water and Food' brought out that as much as three million tons of water can disappear through evaporation alone from each square mile (640 acres) each year from free water surface. This comes to a depth of about four feet of water during the year for an equivalent area.

APPENDIX X

**Evaporation Losses in inches at various Stations in Mysore State*

Month	Name of Stations						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Raichur	Gulbarga	Chitaldrug	Bangalore	Mangalore	Belgaum	Hassan
January	10·45	10·04	10·60	5·39	5·86	9·55	4·50
February	11·90	11·98	10·89	5·91	4·40	9·24	3·98
March	17·33	18·38	14·35	8·87	5·30	15·66	6·29
April	18·75	20·61	11·19	7·59	6·21	11·70	5·19
May	19·41	20·00	9·49	7·22	5·70	9·39	6·42
June	13·05	12·12	7·05	5·40	2·19	5·79	3·27
July	9·49	7·53	5·30	4·31	1·95	2·85	2·60
August	9·27	7·41	5·45	4·09	1·83	2·45	2·64
September	7·35	6·39	4·92	3·63	1·95	2·67	2·61
October	9·36	9·11	5·58	3·91	2·54	5·12	3·16
November	8·76	9·36	6·69	4·29	3·45	8·13	3·57
December	8·62	8·46	8·09	4·62	5·24	9·39	3·60
	143·74	141·40	99·60	65·23	46·62	91·94	47·83

**Vide* India Meteorological Department SCIENTIFIC Notes Vol. Nos. 61—68.

APPENDIX XI

Coorg District

Proposals of Minor Irrigation Schemes for 3 *Years from* 1959-60 *to* 1962-63

	Approximate cost	Acreage to be benefitted
	Rs	Acres
I. *Bandara Schemes:*—		
1. Bandara across Kyathehole and excavation of channel on either side for about 10 miles.	10,00,000	2,500
2. Bandara across Harangi river at Hardoor bridge and Right Bank channel for 20 miles.	8,00,000	2,500
3. An anicut across Honnicoppal stream in Sanivarsanthehoble and Right Bank Channel for 5 miles.	2,00,000	1,000
	20,00,000	6,000
II. *Lift Irrigation Schemes:*—		
4. 2 Lift Irrigation schemes on the bank of river Pyaswam	1,00,000	500
5. 6 Lift Irrigation schemes on the banks of Cauvery from Bathri upto Fraserpet.	2,00,000	1,200
6. 4 Lift Irrigation Schemes on the banks of Cauvery from Hebbale to Sirangala.	2,00,000	1,500
7. One Lift Irrigation Scheme on the banks of Rudraguppe hole.	50,000	400
	5,50,000	3,600
TOTAL ..	25,50,000	9,600 or say 10,000

III. *Power lines to the pumpsets*:—

	Length of line	Cost
	Miles	Rs.
Powerline from Fraserpet upto Bathri along Cauvery	20	3,00,000
Powerline from Fraserpet to Sirangala	12	1,80,000
Powerline from Siddapur to Virajpet	15	2,25,000
Powerline from Virajpet to Rudraguppehole	20	3,00,000
Powerline from Fraserpat to Kudiga and along Harangi ..	15	2,25,000
Powerline from Fraserpet to Peraje Via Mercara	50	7,50,000
Total ..	132	19,80,000
GRAND TOTAL ..		45,35,000 or say 45,00,000

APPENDIX XII

THE MYSORE IRRIGATION, ACT 1932.

(As amended by Acts VII of 1938 and VII of 1952)

*CHAPTER VI-A

Inserted by Act VII of 52 Interpretation of 'minor irrigation works' and 'order

OF THE MAINTENANCE OF MINOR IRRIGATION WORKS

30-A. In this Chapter.

(i) "minor irrigation works", means such irrigation works as the Government may, from time to time by notification in the Mysore Gazette. declare to be minor irrigation works for the purposes of this Chapter and

(ii) "order" means an order published in the Mysore Gazette.

Declaration in respect of maintenance of Minor irrigation works by Government.

30-B (1) If the Government considers that in the interests of the proper irrigation of lands in any area, the work of maintenance in a fit state of repair of minor irrigation works in such area should be undertaken by the Government and the cost of such maintenance or any part thereof recovered from the holders of lands in the area benefitted by such minor irrigation works (hereinafter in this Chapter called the benefitted area), the Government shall make a declaration to that effect.

(2) The declaration under sub-section (1) shall be published in the Mysore Gazette in English and Kannada and in such other manner as may be prescribed.

Consequences of the making of the declaration under Section 30—B

30-C (1) On the making of a declaration under sub-section (1) of section 30-B, the Government shall maintain in a fit state of repair such minor irrigation works and every holder of lands in the benefitted area, shall pay to the Government an acreage contribution at such rates, not exceeding three rupees per acre per annum, as the Government may, by order, determine,

(2) Every order made under sub-section (1) shall be laid before the Mysore Legislative Assembly as soon as may be after it is made, and shall be subject to such modifications as the said Legislative Assembly may make on a motion made within seven days from the date on which the order is so laid.

Levy of contribution on lands within the benefitted area.

30-D When the Government undertakes the maintenance of any irrigation work under sub-section (1) of section 30-C the Deputy Commissioner of the District shall, subject to such rules as may be prescribed in this behalf, levy from the holders of lands within the benefitted area in addition to the assessment fixed under the provisions of section 112 of the Mysore Land Revenue Code, 1888, acreage contribution per annum at the rates determined under Section 30-C. Such contribution shall be recoverable as a revenue demand.

APPENDIX XII—*contd.*

CHAPTER VIII

OF CUSTOMARY—LABOUR

Works for which customary labour is enforced.

34. The provisions of this chapter shall apply to tanks, river and spring channels, feeder channels connected with tanks, and other irrigation works which have been brought up to standard and handed over to the raiyats for upkeep.

Added by Act. VII of 1938.

(34-A* For the purposes of this chapter, an irrigation work includes such work in an inam village, though it is not constructed maintained or controlled wholly or mainly by Government)

Nature of and person liable to perform customary labour and the levy of cash contribution in lieu of labour.

35. (1) Every occupier of land, irrigated or served by any irrigation work, as well as the inhabitants of the village or villages and all others who derive any benefit, directly or indirectly from the work, shall perform, in respect of such work, without payment, the following customary labour :—

(a) filling up gullies, cracks, ruts and holes in the earth work;

(b) removing any rank growth or pernicious weed;

(c) clearing such underwood as may be considered by the Irrigation Officer to be injurious;

(d) clearing sand or silt—from sluices and branch channels and repairing the earth work of petty and branch channels and clearing the accumulation in sluices and in all channels issuing from tanks; which obstruct the flow of water to the fields;

(e) maintaining the bund to the standard level and with the slopes specified;

(f) keeping in order the feeder channels of tanks;

(g) watching the bunds during rainy weather, turfing—the parts acted on by the waves, helping in opening and closing the sluices and generally performing minor duties of this nature in order to prevent breaches and other accidents.

Explanation—All land forming part of the registered or recognised atchkat of an irrigation work shall be deemed to be land irrigated by this work, within the meaning of this section.

(2) The Government may, by an order, direct in respect of all or any of the aforesaid works in a locality that the customary labour to be performed under this section need not be performed either wholly or in part, or that in lieu of such labour a contribution in cash at such rates as may be fixed under rules made in this behalf be levied from the persons bound to perform the same; provided that

no such order of commutation shall be made except with the consent of two thirds of the number of persons bound to perform such labour. Such order may, at any time, be cancelled or modified by the Government.

Village patel responsible for due performance of customary labour

36. It shall be the duty of the patel of every village *(and the inamdar in the case of an inam village) to see that in respect of any irrigation work situated in the village or villages in his charge the customary labour specified in section 35 is duly performed and the work maintained in an efficient condition.

*Added by Act VII of 1938.

Execution of work with hired labour on failure of customary labour.

37. If any person, who under this chapter is bound to contribute labour towards any irrigation work, neglects or refuses to do so, the patel (*the inamdar in the case of an inam village) or other officer empowered by Government in this behalf may get the work performed by hired labour, after giving notice by beat of drum in the villages in which the persons bound to do the work ordinarily reside or the land served by such irrigation work is situated, requiring such persons to carry out the work by a specified date and on their failure to comply with the requisition within the appointed time.

*Added by Act VII of 1938.

Determination of quantum of labour to be contributed

38. The quantum of labour which each person liable under section 35 is bound to contribute, and proportionate share of labour for each village where an irrigation work serves more than one village, shall be determined in accordance with rules framed by the Government in this behalf.

39. Whenever any person who is bound to contribute labour under section 35, neglects or fails to do so without sufficient and reasonable cause, the Irrigation Officer may levy from such person a sum equivalent to the value of the labour which such person is bound to contribute, and such amount shall be recoverable as an arrear of land revenue.

From the order of the Irrigation Officer, an appeal shall lie, within thirty days from the date of service of the order to the Deputy Commissioner, whose decision shall be final.

APPENDIX XIII

Observations of the Irrigation and Power Team on Desilting-*cum*-Reclamation of tanks in Mysore State.

There are about 35,000 tanks in the integrated State of Mysore. Prior to integration there were 25,000 tanks in Mysore State on which the ayacut was about 7,45,000 acres and water spread of the tank was about 5,02,000 acres. Some of these tanks have got water spread many times more than the ayacut commanded by them. There has been considerable siltation in these tanks and their effective capacity has considerably reduced with the result that the settled ayacut cannot be irrigated properly.

I. For improving the efficiency of the silted tanks the methods adopted so far are :—

1. Raising banks and over-flow weirs by which the full supply level of the tank is raised. This results in flooding some of the lands on the foreshore of these tanks belonging to private people, and thus throws more land out of cultivation. Besides compensation has to be paid for such lands which are flooded.

2. The tank beds are desilted and the soil is thrown on the private lands. This is either done free of cost for the people on whose land the soil is thrown or sometimes even compensation is paid if the lands are rendered useless by throwing soil from desilting.

It is now proposed to combine desilting of the tanks with reclamation This is expected to result :—

(*a*) in reducing the water spread which in turn will save evaporation losses;

(*b*) the lands so reclaimed will be available for cultivation and thus they will be a capital asset;

(*c*) in increasing the capacity of the tanks which will provide more assured water to the ayacut and restore the ayacut which has gone out of tank cultivation due to the siltation of the tanks.

By the sale of lands a revolving capital fund is expected to be created which will enable the restoration of tanks to a greater extent than what is possible at present.

There can be no doubt that there will be saying in evaporation losses on reducing the water spread by reclamation of the land near the foreshore.

On a tank if the excavated material is to be deposited along the foreshore to a level not higher than the full tank level, then no improvement is made in the capacity of the silted tank although some land at the foreshore, where the excavated material is deposited, gets reclaimed. As however the main idea of desilting a tank is to increase its capacity for a given full tank level, it is necessary to excavate further material from the tank and deposit it at the foreshore above the full tank level. The increase in the capacity would be equal to the amount deposited above full tank level. The manner of deposition of the excavated material above the full tank level will be indicated by local conditions in each case and will

have to be so arranged as not to interfere with the drainage of the marginal areas.

In Mysore the practice seems to be to allow six feet depth of water for paddy cultivation. The tank is taken to fill twice during the season. Therefore, in a tank which has a depth of only six feet above the sill level of the sluice the maximum area which can be irrigated by the maximum desilting would be twice the area of the lake. For a depth of X feet above the sill level of the sluice and A being the area of the lake in acres, the maximum irrigation with maximum desiltation that can be done would be $\frac{X \times 2}{6} \times A = \frac{X}{3} \times A$. This supposes a horizontal excavation of the bed at the sill level of the sluice. This basis would indicate the minimum tank spread which is required for a given ayacut. Any reduction of the tank area below this minimum requirement would result in reduced irrigation from the tank, no matter to what depth the tank is excavated.

These tanks not only store water to be utilised directly for irrigation but also help in raising ground water-table downstream of the tank. This raised ground water-table comes in handy in doing irrigation by means of open wells. This aspect is quite important as the existence of a tank in many cases has enabled more irrigation to be done than obtained by direct flow from the tank.

It is not necessary to restrict the storage of the tank to the prescribed full tank level. Each case should be reviewed afresh to see whether it would not be economical to raise the full tank level without increasing water spread by combining it with reclamation.

As desilting of tanks becomes necessary periodically, it will be useful to retain some of the reclaimed land for deposition of future desilted material.

II. In the two tanks namely Hebbal and Sulebele where experimental work has been taken up, a jack bund 4 ft. above full tank level is being put on the periphery of the land reclaimed. Thus some silt from the bed of the tank is put in the jack bund above the full tank level, which adds to the capacity of the lake. The question is whether the jack bund is desirable or not. The jack bund constructed on the side of the valley from where the water enters the lake will serve to guide the water but on the foreshore there is a possibility of this jack bund obstructing the drainage of the marginal lands.

In case of Hebbal tank where the full tank level is not being raised, the total quantity of earth to be desilted is the equivalent of 7.6 units giving an actual gain in the capacity of the lake of 2.49 units. The area to be reclaimed is 34 acres. The land being near the Agriculture College is particularly valuable and is expected to fetch a price of Rs. 4,000 to 5,000 per acre.

In case of Sulebele tank the full supply level of the tank is being raised by 2 ft. by increasing the height of the main bund. This is being combined with reclamation of some marginal lands. The original capacity of the tank was 74 units and the present capacity is 26.5 units. The new capacity will be 61.5 units. In this particular case the increase in capacity is mainly due to raising of the full supply level. An area of 39 acres is proposed to be reclaimed on this tank.

As a result of our inspection we have to make the following suggestions :—

(1) Before any reclamation and desilting work is undertaken, a contour survey not only of the tank but of the marginal lands for some distance above the full tank level should be made. This will help in selecting the land for reclamation.

(2) In a tank where water is coming from all sides of the foreshore, the construction of a jack bund may cause obstruction to drainage of the surrounding lands. Careful observations should be made of the flow of water into the lake where reclaimed lands have been surrounded by jack bund.

(3) Where no jack bund is built the reclaimed land should be raised and given a reverse slope to prevent the fresh earth from washing into the tank. Along the periphery a strip of about 20 ft. may be put under grass as soon as the earth work is finished.

(4) The desilting should as far as possible be done from the lowest level correponding to the sill level of the irrigation outlet. But as this may increase lead considerably, where work is done by the manual labour, the borrow-pits should be about 50 ft. away from the periphery of the reclaimed land. These borrow-pits dug preferably to sluice sill level should be connected with the deeper part of the lake so that they will get drained as the lake level goes down.

(5) The desilting work should be started in good time as soon as the lake level goes down in winter and completed before the rains set in.

(6) The cheapest methods for desilting should be adopted. The use of suitable wheel barrows where lead is long should be considered.

APPENDIX XIV

GOVERNMENT OF MYSORE
LEGISLATIVE DEPARTMENT

MYSORE ACT No. 28 OF 1957.

(First published in the Mysore Gazette on the Thirty-first Day of October, 1957.)

THE MYSORE IRRIGATION (LEVY OF BETTERMENT CONTRIBUTION AND WATER RATE) ACT, 1957.

(Received the assent of the Governor on the Twenty-fourth Day of October, 1957.)

An Act to consolidate and amend the laws providing for the levy of betterment contribution and water rate in the State of Mysore.

WHEREAS it is expedient to consolidate and amend the laws relating to the levy of betterment contribution and water rate in the State of Mysore;

BE it enacted by the Mysore State Legislature in the Eighth year of the Republic of India as follows :—

1. Short title and extent—(1) This Act may be called the Mysore Irrigation (Levy of Betterment Contribution and Water Rate) Act, 1957.

(2) It extends to the whole of the State of Mysore.

(3) It shall come into force on such date as the Government may by a notification appoint. /by a

2. Definitions—(1) In this Act, unless the context otherwise requires—

(*a*) 'Collector' means the Collector or Deputy Commissioner of a District or such other officer not below the rank of a Deputy Collector or Assistant Commissioner as the Government may appoint to discharge the functions of the Collector or Deputy Commissioner under this Act;

(*b*) 'contribution' means the betterment contribution referred to in section 3;

(*c*) 'drainage work' includes—

(*i*) channels, whether natural or artificial, for the discharge of waste or surplus water and all work connected with and auxiliary to such channels;

(*ii*) the escape channels from an irrigation work;

(*iii*) dams, weirs, embankments, sluices and groynes;

(*iv*) all works for the protection of lands from floods or from erosion, which are owned or controlled by the Government, but does not include works for the removal of sewage;

(*d*) 'Government' means the State Government;

(*e*) 'Irrigation work' includes :—

(*i*) all canals, channels, tanks, wells, reservoirs, anicuts, bandharas, ponds, spring ponds, kuntas, talapariges and madugus used for the supply or storage of water, and all works embankments and structures, installations, including the installation of a pumping set, supply and escape channels connected therewith or auxiliary thereto which are owned or controlled by the Government.

(*ii*) all such lakes and other natural collections of water or parts thereof as are situated on lands which are the property of the Government;

(*iii*) all natural waterways, rivers and streams or parts thereof;

(*f*) 'landholder' or 'holder' signifies the person in whom a right to hold land is vested, whether solely on his own account, or wholly or partly in trust for another person or for a class of persons or for the public; and includes a mortgagee vested with a right to possession :

Provided that in respect of any land in the possession of a walawargadar, a kayamgenidar, a permanent tenant or a mulgeni tenant in the South Kanara District, such walawargadar, kayamgenidar, permanent tenant or mulgeni tenant, as the case may be, shall be deemed to be the landholder in respect of such lands;

(*g*) 'notification' means a notification published in the Official Gazette;

(*h*) 'prescribed' means prescribed by rules made under this Act;

(*i*) 'work' means an irrigation or drainage work whether completed or not.

2. The Mysore General Clauses Act, 1899 (Mysore Act III of 1899) shall apply for the interpretation of this Act, as it applies for the interpretation of a Mysore Act.

3. Levy of betterment contribution :— The Government shall be entitled to levy a betterment contribution, in accordance with the provisions of this Act, from the landholder or holder of any land which, in its opinion, is benefited by the construction, restoration, expansion or alteration of any work by the Government, whether after the commencement of this Act or at any time before such commencement, but not earlier than —

(*i*) the first January 1944 in the Mysore Area;

(*ii*) the first January 1947 in the Madras Area;

(*iii*) the first August 1947 in the Hyderabad Area; and

(*iv*) the first January 1950 in the Bombay Area and the Coorg District.

Explanation I—A land shall be deemed to be benefitted notwithstanding that the benefit is not enjoyed, provided such non-enjoyment is due solely to action or inaction on the part of that person or persons interested in such land .

Explanation II—A land shall not be deemed to be benefitted merely by reason of the execution of ordinary repairs and maintenance of an existing work wholly or partly at the expense of Government.

4. Amount of betterment contribution.—(1) Subject to such rules as may be prescribed, the Collector shall determine the contribution payable in respect of each of the lands mentioned in section 3, after taking into account the increase in its capital value as estimated in the prescribed manner :

Provided that the contribution shall in no case exceed five hundred rupees per acre.

(2) Before determining the contributions payable under sub-section (1), the Collector shall invite objections and suggestions, in such manner as may be prescribed, from the persons liable to pay the same and consider in the prescribed manner all objections and suggestions received from them.

(3) Any landholder aggrieved by any determination made by the Collector under sub-section (1) may, within the prescribed time appeal to the prescribed authority and the prescribed authority may pass such orders on the appeal as it thinks fit.

(4) Any order passed by the prescribed authority on appeal preferred to it under sub-section (3), and subject to the orders aforesaid of the prescribed authority, the determination of the Collector under sub-section (1) shall be final and shall not be liable to be questioned in any Court of law.

5. When contribution becomes payable—(1) Contribution shall become payable under this Act on a written notice of demand therefore issued by an officer authorised by the Government in this behalf being served on the landholder.

(2) For the avoidance of doubt, it is hereby declared that it shall not be necessary to serve notice on any person other than the landholder, who has an interest in the land or on a successor-in-interest of the landholder or in respect of any instalment of the contribution.

6. Mode of payment of contribution—(1) The landholder of any land, in respect of which any contribution is payable, shall pay it in the manner prescribed either by surrendering to the Government a portion of his land the value whereof is equal to the amount of contribution, or in cash, or partly by surrendering land and partly in cash.

(2) Where the landholder chooses to pay the whole or part of the contribution by surrendering land, the surrender shall be subject to the following conditions :—

(*a*) the value of the land offered for surrender shall, for the purpose of payment of contribution, be determined by the Collector in the prescribed manner;

(*b*) the owner of the land shall prove to the satisfaction of the Collector that such land is free from all encumbrances; the Collector shall notify the proposed surrender and invite objections in such manner and within such period as may be prescribed; if any objection is received and the Collector is satisfied that the land is not free from encumbrance, he shall refuse to accept the surrender and shall recover the contribution in cash; if no objection is received and the Collector is satisfied that the land is free from encumbrance, he shall by order in writing

accept the surrender and after such acceptance, the land shall vest in the Government free from all encumbrances and the Government may dispose of it in such manner as it deems fit :

Provided that the Collector may on the ground of inaccessibility or inconvient location of the land or such other grounds as may be prescribed refuse to accept the surrender.

(3) The Government may by general or special order direct that in respect of any work, or class of cases the contribution shall be payable only in cash and not by surrendering land.

(4) Where the contribution is payable in cash, it shall be payable in such number of annual instalments not exceeding twenty and at such times as may be prescribed :

Provided that if, on or before the date on which the first instalment is payable, or at any subsequent date within a period of two years from that date, the owner pays the entire contribution or the balance of contribution, as the case may be, he shall be entitled to a rebate of ten per cent of such contribution or balance of contribution, as the case may be :

Provided further that if the amount of contribution fall into arrears, interest shall be payable at the prescribed rate on the amount of such arrears.

7. Contribution recoverable as arrears of land revenue—Contribution payable under this Act in respect of any land shall be deemed to be a revenue demand due upon the said land; and the land, its products and the building (owned by the landholder) standing upon the land, shall be deemed to be the security for the contribution. When any instalment of the contribution payable in any year is not paid on the due date, the amount of the instalment shall be deemed to be an arrear of land revenue and the provisions of the law in force regulating the recovery of land revenue, shall apply to the recovery of the said arrear together with the interest due thereon, as it applies to the recovery of the land revenue due on that land.

8. Payment of contribution by person having interest in land. —Any person having interest in a land may, notwithstanding that he is not the landholder of such land, pay the contribution payable by the holder in respect of such land and shall, if such person pays the entire contribution within a period of two years from the date on which the landholder becomes liable to pay the contribution, be entitled to a rebate of ten per cent.

9. Right of reimbursement in respect of contribution.—Where the landholder (not being in the South Kanara District a Walawargardar, a kayamgenidar, a permanent tenant or a mulgeni tenant) liable to pay contribution under this Act is not the owner of the land or is a co-owner of the land, nothing in this Act shall be deemed to affect his right to reimbursement from the owner or to recover proportionate part from the co-owner, as the case may be.

10. Levy of water rate. (1) Whenever :—

(*a*) water is made availab'e by the Government for the use of any benefitted land in respect of which betterment contribution is levied·

(*b*) water is supplied or used for purposes of irrigation from any work belonging to, or constructed by, or on behalf of the Government; and

(*c*) water from any such work, by direct flow or percolation or by indirect flow, percolation or drainage from or through adjoining land irrigates any land under cultivation or flows into a reservoir and thereafter, by direct flow or percolation or by indirect flow, percolation or drainage from or through adjoining land irrigates any land under cultivation and, in the opinion of the Collector such irrigation is beneficial to and sufficient for the requirements of crop on such land,

the Government shall be entitled to levy a separate charge for such water hereinafter referred to as water rate and the Government may prescribe the rates at which, the manner in which and the authority by which such water rates shall be fixed :

Provided that no water rate shall be leviable under this Act in respect of water supplied or used for the irrigation of land which is classified and assessed as wet, unless the land be irrigated, whether voluntarily or involuntarily, and whether wholly or in part : rin-

(*i*) from any source hereinbefore mentioned, not being a source which has been assigned by the Revenue authorities as the source of irrigation of such land; or

(*ii*) from any source assigned in respect of such land otherwise than in accordance with a notification or order of the Government or of any authority subordinate to it, regulating or specifying the time, method and conditions of supply of water for the irrigation of such land from such source and the number of crops which may be irrigated on such land with such supply, free of separate charge.

(2) For the avoidance of doubt, it is hereby declared that water rate leviable under this Act is not a tax on land but is a charge for the water supplied or used for the irrigation of lands.

(3) The amount of water rate shall be recoverable in the same manner as arrears of land revenue due on the land.

11. Power to make rules.—(1) The Government may subject to the condition of previous publication, by notification make rules to carry out the purposes of this Act. e

(2) In particular and without prejudice to the generality of the foregoing power, such rules may provide —

(*a*) for the delegation of powers of the Government to such authority or authorities as may be notified;

(*b*) for the provision of such appeals and revision as may be found necessary in respect of the orders passed by any authority to whom powers may be so delegated; and

(*c*) for all matters expressly required or allowed by this Act to be prescribed.

(3) All rules made under this Act shall be laid as soon as may be after they are made before the State Legislative Assembly while it is in session, for a total period of one month which may be comprised in one session or in two or more sessions and if before the expiry of that period, the State

Legislative Assembly makes any modification in the rules or directs that any rule shall not have effect, the rules shall thereafter have effect only in such modified form or be of no effect, as the case may be.

12. Repeal and savings.—Chapter VI of the Mysore Irrigation Act, ct, 1932 (Mysore Act I of 1932); section 53 of the Mysore Land Revenue Code, 1888 (Mysore Act IV of 1888); section 53 of the Bombay Land Revenue Code, 1879 (Bombay Act V of 1879); section 53 of Hyderabad Land Revenue Act, 1317 F. (Hyderabad Act VIII of 1317 Fasli); sections 44, 48, 48A, 49, 50, 51, 52, 53, 54, 55, 56, 56A, 56B, 56C, 56D, 56E and 56F of the Bombay Irrigation Act 1879 (Bombay Act VII of 1879); the Madras Irrigation (Levy of Betterment Contribution) Act, 1955 (Madras Act III of 1955); the Madras Irrigation Cess Act, 1865 (Madras Act VII of 1865); the Hyderabad Irrigation (Betterment Contribution and Inclusion Fees) Act, 1952 (Hyderabad Act V of 1952); and the Coorg Irrigation Cess Act, 1943 (Coorg Act IV of 1943) are hereby repealed :

Provided that such repeal shall not affect—

(*i*) the previous operation of the said provisions or anything duly done or suffered thereunder; or

(*ii*) any right, privilege, obligation or liability acquired, accrued or incurred under the said enactments; or

(*iii*) any investigation, legal proceeding or remedy in respect of t of any such right, privilege, obligation, liability or forfeiture as aforesaid; and any such investigation, legal proceedings or remedy may be instituted, continued or enforced, and any such forfeiture may be imposed as if this Act had not been passed :

Provided further that the provisions of this Act relating to levy of betterment contribution shall not be applicable to lands in respect of which contribution or betterment charges have already been levied under any repealed enactment and such contribution or betterment charges shall continue to be collected as if this Act had not been passed :

Provided also that the water rate, water cess or irrigation cess levied in respect of any land under any repealed enactment shall continue to be levied until water rates are levied in accordance with the provisions of this Act.

Extract from the Mysore Irrigation (Levy of Betterment Contribution and Water Rate Amendment) Bill 1958.

4. *Amendment of Section* 10—In sub section (1) of Section 10 of)f the principal Act,

(1) in clause (c), for the word "Collector" the words "Deputy Commissioner" shall be substituted; and

(2) for the words commencing from "the Government shall be entitled" to the end of the sub-section, the following words shall be substituted :—"the Government shall be entitled to levy a separate charge for such water (hereinafter referred to as water rate) at such rates, for such period, and in respect of water supplied from such works, as the Government may, by notification, specify; and the rates may be different for lands on which different crops are grown and such levy of water rate may be in lieu of the water rate, if any, payable under any other law in force"

APPENDIX XV

Extract of the Administration Report for the year 1952-53 and 1954-55 for Anjanapur Reservoir Works.

"Contribution levied at Rs. 50 per acre is made payable in 12 annual instalments-Rs. 5 in the first two instalments and Rs. 4 in the then subsequent instalments.

The following was the D.C.B. The figures shown in brackets represent those of 51-52.

	Water Rate			Contribution		
Arrears outstanding	10175 9 9	(10171 11 1)		14890 13 3	(11050 14 10)	
Demand during the year.	60791 6 3	(56481 2 9)		30459 5 5	(41156 5 0)	
Total demand for the year.	70967 0 0	(66652 13 10)		45350 2 8	(52207 3 10)	
Collection during the year.	51719 10 5	(56477 4 1)		29458 11 8	(37316 6 7)	
Balance at the end of the year.	19247 5 7	(10175 9 9)		15891 7 0	(14890 13 3)	

"The following table shows the Demand, Collection and Balance for the year (54-55). The figures shown in brackets represent those of 1953-54.

	Water Rate			Contribution		
Arrears outstanding on 1st July.	11800 12 4	(19247 5 7)		6955 1 10	(15891 7 0)	
Demand during the year.	60791 6 3	(58957 14 8)		20280 8 11	(23786 15 6)	
Total Demand ..	72592 2 7	(78205 4 3)		27235 10 9	(39678 6 6)	
Collection ..	52701 0 1	(66404 7 11)		16485 8 5	(32723 4 8)	
Balance at the end of the year.	19891 2 6	(11800 12 4)		10750 2 4	(6955 1 10)	

APPENDIX XVI

STATEMENT SHOWING OBSERVATIONS AND RECOMMENDATIONS OF THE MINOR IRRIGATION TEAM ALONGWITH COMMENTS OF THE GOVERNMENT OF MYSORE* AND THE MINISTRY OF FOOD AND AGRICULTURE, GOVERNMENT OF INDIA**

Sl. No.	Paragraph No. of the Summary	Summary of the Recommendations of the Team	Comments of the Government of Mysore
(1)	(2)	(3)	(4)
1.	2.	(*i*) Investigations may be conducted to build new tanks upstream so as to command the areas lower down and to supplement the storage lost by siltage;	According to the recent re-organisation of the Public Works Department, investigation units have been constituted to attend to the investigation of irrigation projects in each valley and for compilation and verification of tank registers and other connected works. It would be possible for these units also to investigate the possibility of building new tanks so as to command the areas lower down and to supplement the storage lost by siltage. They will also investigate the possibility of constructing new tanks lower down and of repairing the existing tanks to serve as silt arresters.
		(*ii*) New tanks may also be built lower down and the existing tanks repaired to serve as silt arresters;	
		(*iii*) Preventive measures may be taken to arrest silting by construction of silt traps along the valleys and to conserve soil in the catchment area and in the foreshore lands of the tanks;	Provision of silt traps should be made in every tank Restoration Estimate. To conserve soil in the catchment area, contour bunding should be taken up on an extensive scale. The Chief Engineer is being asked to formulate definite proposals in the matter.
		(*iv*) Wells may be sunk in the atchkat to sulpplement supplies from the Tanks;	This could be encouraged by giving loans to the Agriculturists wherever necessary. Action is being taken accordingly.
		(*v*) Drainage channels may be provided to prevent and recover waterlogged areas wherever necessary;	The work of providing drainage channels in the atchkat areas will have to be taken from the project Funds in the cost of new Projects. Regarding projects in operation the expenditure will have to be met from out of the allocations for Land Reclamation.
		(*vi*) The leaky sluices should be repaired to prevent wastage of water from the tanks;	This work is being attended to. Now that each taluk has an Assistant Engineer according to the recent Reorganisation, there should be no difficulty in paying immediate attention to the repair of leaky sluices.
		(*vii*) The water requirements of plants in field condition may be studied on a regional basis.	This pertains more to the Agricultural Department. The Research Station at Krishnaraja Sagar is also conducting some experiments in this regard.

*Received under Government of Mysore letter No. PWD 128 GIG 59 dated the 9th September, 1959 from the Secretary, P.W.D. to the Secretary, Minor Irrigation Team.

**Comments of the Ministry of Food and Agriculture are at page 62.

APPENDIX XVI—*contd.*

(1)	(2)	(3)	(4)
		(*viii*) Simple and cheap instruments may be introduced to measure water supply for irrigation, as measured supply ensures optimum utilisation and maximum return;	Serious thought has to be bestowed to this aspect of economising in the use of water. Control devices have to be introduced and adherence to the rules of Regulation strictly enforced. The Hydraulic Research Station at Krishnaraja Sagar will be asked to give thought to this important problem.
		(*ix*) Additional power may be provided to facilitate installation of pumps in large numbers.	This is being done to the extent power is available.
2.	3.	When the tanks are built in series, defects breaches in any one of the tanks jeopardise the safety of the other tanks. It is, therefore, imperative that the Investigation Unit should inspect all the tanks in the series and bring the restoration of such works that require immediate repairs, under the programme of works.	It is contemplated to take up restoration works valley-wise subject of course to certain practical considerations such as priority being given to such of the tanks in other valleys which need immediate attention.
3.	4.	There is considerable scope for the release from the tanks of large extents of lands, which are obviously very fertile and will be eagerly taken up by cultivators for raising different crops. The Investigation Unit should take up this work and initiate large number of such projects in regions wherever this is practicable.	Restoration-*cum*-Reclamation works can be tried up wherever feasible.
4.	5.	In order to avoid loss of water if villagers default in maintaining tanks, the Team commends the proposal of the Mysore Government to have all the works, including maintenance, executed by the Public Works Department and to start a non-lapsable fund to reorient the functions of the Taluk Boards and Panchayats by levying an acreage cess, not exceeding Rs. 5 per annum from the beneficiaries in lieu of their obligatory duties towards maintenance of the tanks.	After the Irrigation Bill which is now before the State Legislature is passed, there is expected to be an intensive drive to take over tanks by Government for maintenance.
5.	6.	The Team suggests that in each Taluk, specific zones, depending upon the number of works, should be marked out, lists prepared and the inspection every year by the subordinates, whose jursidiction covers that zone, insisted.	The Chief Engineer will be asked to make necessary arrangements to see that the tanks are inspected by the Public Works Department Officers periodically and also in accordance with a programme so that no tank escapes timely inspection. Special treatment will however have to be given to such of the tanks as discharge across the Railway lines.
6.	7.	It is recommended that the spillways should be carefully designed on modern principles of unit hydrograph methods etc. so as to avoid damages to the earthen bunds. The present capacities as provided are on the low side, generally.	The design of spillway is an important aspect in an irrigation work which should be done more on a scientific basis rather than on thumbrule. A great deal of field study, compilation of statistics and observation and Research are required in this direction and it is expected that the new Investigation Units assisted by the Hydraulic Research Station at Krishnaraja Sagar would be able to standardise these designs. These designs should not only aim at safety but also at economy

APPENDIX XVI—*contd.*

1) (2)	(3)	(4)
7. 8.	The side slopes of the tank bunds as obtaining on most of the tanks are steep and the water side slopes are generally steeper than the rear slope whereas it should be the reverse. Similarly, the top widths vary considerably from 3′ to 66′. Standard top widths graded according to the height of bunds with a minimum of about 8′ may be prescribed. The public roads running above the bunds with zig-zag alignments need to be provided on srtaight berms to avoid accidents to fast moving traffic. Such remodelling as may be necessary on important Tanks, may be executed in conjunction with desilting operations, utilising the excavated material.	The front slope of the tank bund is (as per practice in old Mysore) kept at 1½ to 1 and is protected by stone revetment. This is found to work satisfactorily in respect of soils found in old Mysore. The rear slope is suitably designed to see that saturation grade is kept well within the section of the bund. The rear slope generally varies from 2 to 1 in the case of low bunds and 4 to 1 for high bunds and is turfed. In north Mysore, the design followed is after the practice in vogue in Bombay. A standard practice as applicable to the whole State has now to be evolved depending on the soil that is going to be used for the bund in each case. The soil analysis section in the Hydraulic Research station at Krishnaraja Sagar has been working on this and the Chief Engineers should be able to expedite in this matter of evolving suitable standard desings as could be applied to the entire State. Action is being taken accordingly.
8. 9.	The specification provides for hand-tamping for earth work to bund. If mechanical devices run on diesel oil and easily handled by one or two men are adopted, better quality work would result if executed departmentally. This would not be liable to rapid deterioration as in the case of hand-tamping. However, before mechanical tamping is introduced it needs to be tried on a number of works in each district to test its efficacy and practicability as the local conditions differ from area to area.	Consolidation by machines is certainly superior to hand tamping. But it may not be possible to resort to mechanical tamping in all and sundry works. However, resorting to mechanical tamping is worth while in the case of new tank works where large volume of Earthwork is involved.
9. 10.	It is essential that stone-pitching up to rear flood level instead of turfing should be provided to the rear slopes, wherever stone is available in close proximity.	This may be adopted wherever stone is easily available nearby but is certain to increase cost.
10. 11.	It is suggested that a provision of one foot thick well kneaded puddle casing may prove a good preventive aganist leaks in sluices and avoid breaches. Though this modification involves extra cost, the same will be compensated by effective working, thereby reducing maintenance charges.	This should be done and is being done also in old Mysore.
11. 12.	The Team proposes that a Sepcial Wing in the Public Works Department may be set up so that concerted efforts are made for regular inspecton, maintenance and timely execution of all minor irrigation works in the State.	The question of setting up a Special Wing in Public Works Department for Minor Irrigation works may be considered in the course after watching the results of the Recent Reorganisation of the Department.
12. 13.	In view of the results of the experiment so far conducted, the Team suggests that the Scheme of Desilting-*cum*-Re-	The programme of Desilting-cum-Reclamation will be taken up in the Third Five Year Plan to the extent feasible after the

APPENDIX XVI—*contd.*

(1) (2)	(3)	(4)
	clamation may be implemented according to a phased programme for the restoration of large number of tanks in the State forming an integral part of the Irrigation Schemes in the Third Five Year Plan.	results of the experiments now being conducted are known.
13. 14.	The present procedure for betterment levy and water rate was adopted by the State only in 1957. The Team feels that the system being recently introduced needs no further changes at this stage.	No comments.

APPENDIX XVI—*concld.*

Krishan Chand, ICS,
Joint Secretary.

D.O. No. F. 9-17/58-IRN
Government of India
MINISTRY OF FOOD AND AGRICULTURE
(Department of Agriculture)
New Delhi, September 3, '59

My dear Borker,

Please refer to your D.O. No. COPP/93/58/1560, dated 29th August 1959, addressed to Shri K. R. Damle, ICS, Secretary, Department of Agriculture . We have gone through the Report and have no comments to make.

Yours sincerely,
Sd/- Krishan Chand

Shri D. S. Borker,
Secretary, Consultative Committee,
Irrigation and Power Projects,
Committee on Plan Projects,
Krishi Bhavan,
New Delhi.

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