



INTERIM REPORT
ON
MINOR IRRIGATION WORKS
IN
MYSORE STATE



COMMITTEE ON PLAN PROJECTS
(IRRIGATION AND POWER TEAM)
NEW DELHI
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INTRODUCTORY

The Minor Irrigation Team was directed to take up the study of Minor Irrigation works in the States of Mysore, Andhra Pradesh, Kerala and Madras with a view to judging their efficiency relative to their stated objectives. The Terms of Reference were communicated by the Committee on Plan Projects to the Leader of the Team under Memorandum No. COPP/ (4)/17/58 dated the 4th August 1958 (vide Appendix I). The Team consisted of :

Shri N. V. Gadgil,	Leader
Shri Lal Singh, Director of Agriculture (Retd.), Punjab.	Member
*Shri M. Narasimhaiya, Chief Engineer (Retd.), Mysore.	Member
Shri Mahavir Prasad, Irrigation Adviser, Ministry of Food and Agriculture.	Member, <i>ex-officio</i>

Shri D. S. Borker, Secretary to the Consultative Committee, Irrigation and Power Projects, also worked as Secretary to the Minor Irrigation Team.

2. Irrigation works have been in existence from time immemorial and a large number of tanks were constructed at the head of river valleys, often linked with anicuts or pick-up weirs lower down, to store water for use when needed. It seems the history of tank irrigation started in the State of Mysore. A tank at Talagunda in Shimoga District was built by the Kadamba King Kakusthavarman in 6th Century A. D., while Chikballapur Tank in Kolar District was constructed in the year 977-78 A.D. The Sindhuvali Tank with a sluice was built by the Chola King Kulottunga in the year 1106-07 A. D. In 1521 A. D. the Vijayanagara King Krishnaraja built the great channel at Korragal on the Tungabhadra and also the Basavanna channel (Bellary District) which are still in use and of great value. †A large tank 'Siva Samudra' was formed in 1531-32 A. D. on the river Arkavati which served as source of water supply to the Bangalore City.

3. Since August 1947, the Government of India and the State Governments have been focussing their attention on the construction and improvement of minor irrigation works so as to increase food production and to curtail imports. With this in view the problem of minor irrigation was discussed at many conferences by the State Governments as well as the

*Ceased to be Member from 22nd February, 1959.

†Epigraphia Carnatica IX, N. L. 31.

Government of India. The Ministry of Food and Agriculture had also appointed an Expert Committee in 1955 to study the problems concerning minor irrigation. The Committee in its report, published in 1957, observed: "there appears scope for taking special measures that would hold up the fast rate of silting of tanks." After considering this problem in detail, the State Authorities had come to a dead end as their conclusions were: "Desilting was quite unremunerative and not a feasible proposition from the practical point of view because there will be no place to deposit the huge quantity of earth removed. It is, therefore, definite that the idea of desilting has to be abandoned once and for all."

4. The Team discussed its findings from time to time with the Chief Engineer and Director of Agriculture of the Mysore State Government. The Team visited Bangalore, Belgaum, Dharwar, Hospet, Kolar, Krishnagiri, Mangalore, Mercara, Mysore, Raichur, Shimoga and Tumkur several times during the period August 1958 to February 1959. Based on its on-the-spot study, it proposed the scheme of "Desilting-cum-Reclamation", which implies reclamation of the area under the tanks and utilisation of the sale proceeds for carrying out further operations of this character. The Team also discussed this proposal with the Mysore Government officials in detail on the 16th February 1959 and with the Government of Mysore the next day (Appendices II and III). The Government of Mysore agreed to take up the scheme on experimental basis specially the Hebbal Tank during March—July 1959 and four other tanks thereafter. The proposal of the Team was also discussed with the Ministry of Food and Agriculture on the 3rd March 1959, who agreed that the experiments may be carried out in Mysore State (Appendix IV).

5. The final reports in respect of minor irrigation works in the States of Kerala, Madras and Andhra Pradesh as also Mysore, will be submitted shortly after discussions with the respective Governments.

6. We like to place on record our gratitude to Shri V. T. Krishnamachari, Deputy Chairman, Planning Commission, for taking personal interest in the study of minor irrigation problems in these States and also to Shri B. D. Jatti, Chief Minister, Mysore for the assistance given from time to time. The work of the Team was considerably facilitated by the willing cooperation of the Chief Engineer, Irrigation, Director of Agriculture and other concerned officials of the State at all levels.

LETTER OF TRANSMITTAL

No. COPP/MIT/93/58
Raj Bhavan,
Chandigarh.

April, 10, 1959

My dear Pantji,

I have great pleasure in forwarding to you the Report of the Minor Irrigation Projects Team on Minor Irrigation works in the State of Mysore. The work of the Team regarding Andhra Pradesh, Madras and Kerala is still in progress. The Team is collecting necessary data in these States and examining the same with a view to formulating the recommendations. As it will take some time before Reports in respect of Minor Irrigation in the other South Indian States concerned are finalised after discussion with the respective Governments, it has been decided to submit the present Report to you. The main recommendation of the Team suggesting Desilting-cum-Reclamation may be taken up on an experimental basis in Andhra Pradesh and Madras also as conditions of minor irrigation works in these two States are more or less the same as they are in Mysore. These experiments in all the three States would assist in arriving at a closer approximation to the economy, soundness and feasibility of Desilting-cum-Reclamation as a means of restoring minor irrigation works.

2. The Team had discussed with the Government of Mysore its main recommendation and the Government has agreed at the meeting on the 17th February 1959, held at Bangalore that they will take up Hebbal Tank for experimenting the proposed scheme during March—July 1959 and four other tanks will be taken up at a later date in the next working season.

3. If the experiments prove successful in the States of Madras, Mysore and Andhra Pradesh, then the Desilting-cum-Reclamation operations may be taken up on a large scale so that thousands of acres of good land are brought under cultivation.

With regards,

Yours sincerely,
N. V. GADGIL

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

INTERIM REPORT ON MINOR IRRIGATION WORKS IN MYSORE STATE

1. *Population and Area*—Total population of the Mysore State is 1·94 crores with a density ranging from 130 to 690 for different districts, giving an average of 259 persons per square mile. Total area of integrated Mysore State is 74,861 square miles or 4·79 crores of acres of which 2·8 is cultivated, i.e., 61·9% of the total area.

2. *Irrigated Area*—Total irrigated area is 17·39 lakh acres, constituting about six per cent of the total cultivated area. Out of this 7·77 lakh acres are irrigated by tanks, 3·78 lakh acres by Government canals, 3·22 lakh acres by open wells and 2·62 lakh acres by other miscellaneous sources.

3. *Monsoons and Water Utilisation*.—The State has both South-East Monsoon from June to September and North-East Monsoon from October to December. There are three distinct Irrigation Zones—Western Zone characterised by heavy rain-fall of 115" to 350", Central Zone with 20" to 40" rain-fall and Eastern Zone with 15" or even less rain-fall; and rain-fall and configuration accordingly determine the nature of crops and methods of irrigation in these Zones.

4. *Special Features*—Some thought provoking features having close bearing on the subject are:—

- (i) as compared with North India the price of agricultural land in the South on the whole is abnormally high ranging from Rs. 1,500 to Rs. 5,000 per acre and even more in some localities;
- (ii) the price of dry land, on being converted into wet land, increases by 300 to 500 per cent in value;
- (iii) enormity of the number of tanks, in so far as Mysore State alone has no less than 35,000 tanks of various sizes;
- (iv) even more striking than the number of tanks is the abnormal water spread or area physically covered by tanks, which is out of all proportion to the atchket or ayacut i. e. registered culturable commanded area. This wastage of land becomes all the more glaring in view of the abnormally high price of agricultural land adjoining the tanks, which ranges from Rs. 2,000 to Rs. 5,000 per acre; and
- (v) inspite of the high price of land and need for irrigation water, the question of evaporation and percolation losses has not so far received the desired attention.

5. *Soil Erosion*—The Team was deeply concerned to see the extent of soil erosion taking place all over the State during its visit from Bangalore to Hosekote, and Sulebelle Tank, Karkal to Mangalore and to several other places. Even rivers like Gurupur and Netravati in South Kanara District were seen badly silted up due to excessive soil erosion. The State is naturally highly susceptible to soil erosion because of the rolling and undulating nature of lands coupled with heavy rain-fall. While precise figures for the State have not been worked out, some idea of the extent of soil erosion can be had from the studies conducted in the adjoining State of Bombay. It has been estimated that no less than 133 tons of soil per acre are lost by sheet erosion alone in the black soil of Sholapur area. Likewise in Rajasthan State near Kotah, about one third of the total cultivable area has already been ruined by soil erosion and once fertile land has now been converted into gullies and ravines extending over hundreds of square miles. Soil erosion in Mysore State is doing double damage by ruination of the fertile land above and siltation of the tanks below even to the extent of their abandonment.

6. *Irrigation Tanks*—There are over 35,000 tanks varying in size from a few acres to a few hundred acres. The tank system was obviously the most practical and economical proposition in olden days when pressure on land was not so great, land was inexpensive and available in plenty, food supply was not a serious problem, water requirements for irrigation were limited and scientific knowledge about numerous aspects of irrigation had not greatly advanced. All these conditions have, however, vastly changed since pressure on land is now severe, lands are highly expensive, food shortage is most acute and the demand for water is heavy. In spite of all these factors the basic features of irrigation tanks have undergone little change since these originated about seven centuries ago, rather, due to neglect and excessive soil erosion, tanks have got silted up to the extent that some of them have become obsolete and the usefulness of others has been greatly reduced. In fact, the State authorities themselves point out “due to silting the present capacity is only a fraction of its original one and in most cases, either the atchket is reduced or the original atchket is being managed with precarious supply of water”. From a statement furnished by the State Authorities, it is seen for example that Sadanahalli Tank in Bangalore District has a reduced atchket of only 6 acres now against 63 acres in 1907. Similarly Abbigere Tank has reduced atchket of 46 acres against 89 before and Banavarakere reduced atchket of 86 acres against 165 in 1907 (*vide* Appendix V).

7. *Preventive Measures*—If the age long system of tank irrigation is to continue, there seems no other course except to repair these tanks and to raise the heights of their weirs, bunds or banks or to desilt the tanks. The present condition cannot in any case be allowed to persist. Repair of breached tanks is of course indispensable, but raising the bunds, to restore the

original capacity of tanks, has got certain serious limitations. Raising the bunds implies, firstly, bringing more land under submergence—increasing the water spread of the tank which is already too great as compared with the ayacuts—and consequent wastage of more land to that extent; secondly, land coming under submersion belongs to private owners and it has to be acquired by Government at heavy expenses. Thirdly, raising bunds cannot, for obvious reasons be a continuous process. In fact, as the process of silting continues to operate, there must come a time when some tanks will have to be scrapped. With regard to repair of tanks, there is also the difficulty of finance. The State has so far been able to attend to only a few hundred tanks every year which means that at this rate repair of all tanks would require quite a few decades and during that time they will again get silted up. The condition of major tanks is also more or less similar a number of these tanks, breached many years back, are still awaiting restoration while others are in a dilapidated condition.

8. *Silting*.—Silting has been accelerated during the last one or two decades because of the freedom or licence given to landless and others to plough up the foreshores of these tanks necessitated by food shortage and land hunger. The soils made loose by cultivation on the upper side of the tanks or in the foreshores are washed down into the tanks with the very first shower of the Monsoons.

9. *Desilting*.—While desilting may be unavoidable, it is nevertheless a very expensive operation costing Rs. 1,500/- per acre per foot depth. Obviously at this rate even if half the number of tanks are to be desilted to the depth of only six inches, the cost would be about a quarter of a billion of rupees for this State alone, which account for only twenty to twenty-five per cent of the total number of tanks in the South.

10. *Prevention of silting*.—Every effort should be made to prevent silting of tanks in future. This is possible only by preventing soil erosion from the catchment area, foreshores of the tanks and also upper portion of the tanks. If the foreshores of the tanks are covered with vegetation, which is not the case at present, soil erosion—and accordingly silting of tanks—can greatly be minimised, if not altogether stopped. It is not sufficiently realized to what extent the grasses or vegetation bind the particles of soil and increase its water absorbing capacity. They serve as a sieve and force the silt to deposit. Experiments in the United States of America have shown that percolation of water in grassy land was twenty-two times as fast as that in the other soil free from vegetation. In another experiment 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. Experiment conducted over a period of twenty-two years in Oklahoma showed that

Bermuda grass could hold rain water run-off about eight times as much as open tilled ground, whereas in another experiment it was twelve times more; and this grass could stand not only partial submergence but also survive dry period lasting more than a year. Similar experiments conducted by the Department of Agriculture, Government of Bombay, also showed that water losses by run-off were reduced by seventy-five per cent when the land was put under vegetation.

An interesting study of Missouri Experimental Station, United States of America, reveals that whereas it would require no less than 3,000 years to allow the removal of 7" deep soil by erosion, this much damage can take place within 24 years if the land is ploughed deep and left over. And yet this is what happens round-about the foreshores of many tanks in our country. The Department of Agriculture of the Bombay Government has shown that it would require almost 2,000 years to erode 7" of soil if it is under natural vegetation, but this much soil can be eroded in the course of only twenty-seven years if land is brought under jowar cultivation. It is considered essential to give all these illustrations to emphasise the utility of bringing the foreshores of tanks under vegetation if the tanks are not to undergo the continuous process of silting, desilting and re-silting. This can best be achieved by enactment of Land Utilisation Act and its rigid enforcement, which should make it obligatory on the part of the land-owners to bring the foreshores under some kind of fruit trees like cashewnuts or suitable and remunerative grasses, which may serve as effective barriers against soil erosion. It is to be appreciated that the State is already contemplating to introduce necessary Act to control soil erosion and that prevention of erosion in the foreshores of tanks resulting in their silting will receive necessary attention in the proposed Act.

11. *Water-Spread of Tanks.*—The huge number of tanks existing all over the country is surprising enough to an observer. But even more surprising is their water-spread, *i. e.*, the area occupied by tanks which in many cases even exceeds that of ayacut served by the tanks. Many tanks are full of weeds to the extent of giving an appearance of a regular crop like paddy. In fact, the conditions existing at present, namely, vast water-spread (tanks in Mysore State alone occupying about six lakhs of acres), shallow depth of water, growth of weeds in the tank-beds and absence of any trees around tanks to serve as wind-breaks, are conducive to accelerated losses by evaporation. Accordingly, the Team considered it worthwhile to have a detailed study of all the existing tanks in the State in order to determine the percentage of tanks whose water-spread exceeded the atchkets and ratio of ayacut to water-spread etc.

While it was not possible to find detailed information about all the 35,000 tanks in the integrated State of Mysore, information was available in regard to 25,000 tanks of erstwhile Mysore State, which showed that these

tanks, even including the big ones, had an atchket of only 7,44,247 acres against a water-spread of 5,02,610 acres, exclusive of the tanks in the integrated area. The map on the opposite page shows the distribution of tanks in Muthur Hobli in Shimoga District, which is typical of most of the State. The total ayacut area of all the tanks in the integrated State is known to be 7.77 lakh acres as per revenue figures. Uptodate information about water-spread area was not available, but it is likely to be more than six lakh acres. So far as actual water supply to the ayacut is concerned the conditions might be still worse as this data was based on registers compiled in 1903. Since then, for want of repair of tanks and due to heavy silting, their water-storage capacity has been greatly reduced and irrigation in the ayacut is being carried out with restricted supply.

Analysis of data of each individual tank reveals that in no less than twenty-five per cent of the above tanks the water-spread is found to be equal to or even more than their corresponding atchkets. Still more startling than this is the fact, that the total water-spread of these twenty-five per cent tanks is more than half of the total water-spread of all tanks, *i. e.*, 2,52,575 acres out of 5,02,610 acres while their atchket is only 1,64,575 acres. Out of the total number there are about 300 tanks having abnormal ratio of water-spread to ayacut, ranging from 4.1 to 46.1, with an aggregate ayacut area of only 1,577 acres as against a water-spread of 10,083 acres and the list is by no means exhaustive. It is imperative that the work of restoration should be taken up on an emergency basis. The vast area of the water-spread of these tanks is all the more striking when one takes into consideration the abnormally high price of land (Rs. 2,000 to Rs. 5,000) per acre adjoining these tanks.

12. *Staggering water evaporation losses*—The results of experiments conducted in various countries on evaporation losses from free water surface of tanks show that these losses vary from 47" to 147" per year. Even for different parts of Mysore State, evaporation losses vary from a minimum of 46" near the sea coast to as high as 147" in the interior, giving an average of 91" for the State as a whole. In the Punjab State it was 0.4" per day in Summer and 0.2" in Winter.

13. *Reduction of evaporation losses*—Tank system of irrigation does not prevail in any other part of the world to the extent and in the manner as it does in the South. Tanks in this State which only account for 20—25 percent of the total number of tanks in the region occupy an area of about six lakh acres, which is indeed too disproportionate in relation to their storage capacity. Accordingly, the problem of evaporation and percolation losses from these tanks should have deserved the greatest attention in our country, both for irrigation and drinking purposes. Reservoirs, no doubt, exist in other countries also but they have enormous storage capacity in relation to their water-spread and the problem of evaporation losses

in other countries is not so acute as in India. Still the realization of the staggering losses by evaporation from free water surface of tanks, has induced the scientists all over the world to carry out experiments on the most effective method of retarding evaporation losses. *In the United States of America, reduction of the order of thirty to forty per cent has been possible and its economics too have been worked out. Encouraging results have also been obtained in Australia. In our country as well preliminary experiments conducted have shown reduction to the extent of 60% at a water temperature of 60°F. There is, however, an urgent need to intensify the experimental work in order to determine the possibility of reducing losses to an appreciable extent. This is bound to be welcomed particularly in areas where water, not only for irrigation but even for drinking purposes, after the tanks dry up, is so scarce as to force people to cart water from distances. Any measure designed to reduce evaporation losses even by one-third or to prolong the period of availability of water in the tanks by even two months would prove a boon to the public. The benefits accruing would more than off-set the cost involved. The problem is not confined to this State alone. Madras State and Andhra Pradesh have almost double the number of tanks in each case and evaporation losses from these tanks are equally great. Water in some parts of Madras State, especially in Coimbatore District, is so scarce as to necessitate digging of wells up to a depth of hundred feet or more at an abnormal cost of Rs. 30,000 to Rs. 40,000 and in certain cases even a lakh of rupees per well; tanks exist side by side with wells. While losses from both evaporation and percolation are of a serious concern, percolation losses have some compensating features, in so far as water percolating from the tanks into the open wells can again be used for lift irrigation, whereas evaporation is a dead loss.

14. *Desilting-cum-Reclamation*—In view of the basic facts mentioned above, namely (i) all tanks have become badly silted and some to the extent of becoming obsolete; (ii) raising banks or weirs has its own limitations and must ultimately lead to abandonment of these tanks; (iii) desilting by itself is too expensive—the total cost would aggregate to a billion of rupees for all tanks in the South; (iv) scientific knowledge gathered shows that evaporation losses from surface of tanks and by percolation from the bed of tanks are of staggering magnitude; (v) evaporation losses alone are equal to the total requirements of water for crops in an equivalent area; (vi) scarcity of water in most areas and heavy cost involved in creating irrigation potentials; (vii) colossal area occupied by the tanks which is out of all proportion to their storage capacity or the ayacuts served; (viii) abnormally high price of land adjoining the tanks and lastly because the tank system of irrigation is not yet desired to be given up in favour of some other system of irrigation, the most feasible, if not the only course left is desilting of tanks in a manner as to make it, more or less, a self-supporting proposition.

*See Main Report for detailed information.

This is possible by combining desilting with reclamation of lands, *i.e.*, by utilising the soil removed in the process of desilting, for raising the level of tanks on the side of foreshores, thereby reducing the size of tanks without affecting their storage capacity.

15. *Self-supporting Scheme*—*On the basis of desilting work being carried out in some tanks in Madras State by the Irrigation Department where soil removed from tanks is just deposited on private lands instead of reducing the size of tanks, it should be possible to reclaim an acre of land in the tank at an estimated expenditure of about Rs. 1,500 and in certain cases even at less expenses. Since the price of agricultural land around the tanks varies from Rs. 2,000 to Rs. 5,000 per acre, it should be possible to make the scheme self-supporting, if not actually remunerative.

16. *Reduction in Water Spread*—Although it should be possible to reduce the size of tanks by 30 percent, yet a reduction of even 15 per cent on an average would tantamount to *creating an additional cultivable area of nearly a lakh of acres of fertile land in case of this State alone* which at a cost of even Rs. 2,000 per acre would be worth twenty crores of rupees and the land capable of producing a lakh of tons or so of additional foodgrains per year.

17. *Other Advantages*—Apart from the reclamation of large area of valuable land, the scheme has many other advantages, namely, the desilting of tanks which otherwise is considered almost an impossible proposition becomes a practicable scheme, relieving the Central and State Governments of the difficult task of finding colossal funds for restoration of tanks, restoration work, which at the present rate would require half a century, can easily be completed within a decade, even if desilting is carried out with the help of machinery, the scheme will afford an opportunity of employment for a large number of people and percolation and evaporation losses would automatically be reduced *in proportion to* the reduction in the sizes of tanks, which means a reduction of the order of one lakh acres. This would mean saving of water sufficient to irrigate probably double the area of land, if savings in percolation losses are combined with evaporation losses. This saving in evaporation will be in addition to what might be brought about by other artificial means and, in that case also, the expenditure incurred on covering the tanks with fatty compounds will be proportionately less due to reduction in the size of tanks. Thus the scheme viewed from all angles seems to be a practicable one. In fact, as already stated, there seems no other alternative if tank irrigation system is at all to continue in the South.

18. *Experimental Tanks*—Although the Team anticipates no difficulty in implementing the scheme, yet to demonstrate its practicability to the State Government and the public, as also to work out its economics, half a dozen tanks have been selected in consultation with the officers of Agriculture and Irrigation Departments for experiment. The Team recommends, simultaneously with this experiment, employment of a Survey Party to carry

*The subject is treated more fully in the Report on Madras State.

out survey of about twenty-five per cent of the present tanks, so that by the time experimental-cum-demonstration work is over, all the necessary information about different tanks is available to enable the desilting-cum-reclamation work to be undertaken on a large scale. This survey work would also be helpful in getting all the relevant data about these tanks to be brought up-to-date.

19. *Treatment of reclaimed lands* --After the desilting-cum-reclamation work in any tank is over, the newly reclaimed land would have to be immediately put under suitable and remunerative types of grasses, as will be explained in the final Report, to prevent new soil from being washed down again into the tank during subsequent rains. The provisions of embankment may be necessary along the boundary of the new reclaimed land until the grasses get established. Lands so reclaimed can either be sold to recover the cost of desilting, or leased out on long terms on remunerative basis, or utilised by the Agriculture Department for various purposes. It is gratifying that all the lands of the tanks belong to Government which would avoid any kind of complication in dealing with private landowners.

20. *Greater utilisation of sub-soil water*—One of the greatest advantages accruing from the existence of tanks is that rain water is forced to soak into the soil, thereby raising the level of sub-soil water in wells and enabling the cultivators to utilise this water subsequently by lift irrigation as and when needed. Disappearance of tanks, as has already happened in Rajasthan State, brings in its trail, not only soil erosion but depletion and often a sudden fall in the sub-soil water in the wells. Existence of innumerable tanks in the South has no doubt led to the rise in sub-soil water level near the tanks, but little advantage is being taken of the same at present even though there is scarcity of water in the tanks during certain period, need for irrigation is great and sub-soil water is available in abundance at short depth from ground surface. There is enormous scope for encouraging the construction of a large number of wells all around and within the atchket of the tank, for irrigation of crops both within the atchket and in the adjoining lands now being dry-farmed. Pucca masonry wells may be encouraged, in case finances permit, but where the soil is stiff even kacha wells can serve the purpose.

A most paradoxical situation was observed in some places, as in the case of Budegere tank in Shimoga District, where excess of sub-soil water in the ayacut brought about almost water-logged condition resulting in poor crops within the ayacut, while lands adjoining ayacut at a few feet height were suffering for want of water. It is a remarkable example of both "excess" and "scarcity" at one and the same place and at the same time and emphasises the need for planning and greater co-ordination between Agriculture and Irrigation Departments.

Naturally, while the cultivators in the ayacut are disinclined to pay irrigation charges due to poor crop as a result of water-logged conditions, the cultivators of land at slightly higher elevation than the atchket, complain of absence of irrigation water and are ready to pay even higher charges if they can get water. The anomalous position could be greatly improved by having drains in the centre of the ayacut, sinking shallow open wells in the ayacut borders and making available the surplus water, so received, for dry-framed lands requiring urgent irrigation at present. Similarly, in case of Hosekote Tank near Bangalore, as in fact in many other places, a large area of land in the ayacut was seen water-logged and over-grown with weeds, even though on adjoining lands at a height of even couple of feet, excellent crops and plantation of coconuts and bananas could be seen. In short adequate utilisation of sub-soil water available near the tanks, is an urgent need of the State which can be met by encouraging lift irrigation by all possible means.

21. *Survey Organization*—It is recommended that a small Survey Party of representatives of Agriculture, Irrigation and Revenue Departments should be appointed forthwith to survey all areas having shallow sub-soil water and prepare a scheme for working out the total cost of lift irrigation in such areas and also the manner in which it can be most economically, expeditiously and effectively implemented.

Some of the big tanks have been completely silted up and have lost their original storage capacity. Instead of desilting the tank beds at a heavy cost, it would be worthwhile and a more practical proposition to encourage the people to sink open wells in these tank beds and bring the same under cultivation in order to fully utilise the land now lying waste as also the sub-soil water available there.

22. *Anicuts and Water Lifts*—Anicuts and water lifts offer considerable scope for further extension of irrigation—area already irrigated being about 2.6 lakh acres. Anicuts help in raising the water level in the streams and in drawing small canals therefrom, thereby enabling water to reach the fields by gravity or flow irrigation. In some places water is also lifted by pumps from these streams. But the progress in this direction has so far been limited for want of adequate funds. At present cultivators in several places put in kacha earthen bunds across the streams, after the cessation of rains, to divert the flow of water to fields. These bunds, however, are easily washed off and have to be put in year after year.

The Team also observed large stretches of land all along the banks of rivers like Netravati and Gurupur which offer great scope for the utilisation of water for irrigation on the flanks. At present, water in the rivers flowing for a good portion of the year, subsequent to the rainy season, just flows into the sea, which could otherwise be utilised for non-paddy crops. Construction of anicuts or weirs across the rivulets and streams, both for flow irrigation and lift irrigation, are urgently called for.

Coorg District with quite a heavy rainfall has also large tracts of waste land and perennial streams which could be exploited to bring additional area under irrigation. The State Irrigation authorities discussed with the Team a three-year scheme for extension of minor irrigation in Coorg District which would involve an expenditure of about twenty lakhs of rupees on the construction of anicuts and it would bring about six thousand acres of additional land under irrigation.

Wherever anicuts or canals therefrom for flow irrigation cannot be constructed on account of the situation or topography of lands, lift irrigation is the only alternative to command such lands. At present water is being lifted directly from the rivers, streams and open wells either by means of manual labour, adopting crude forms of contrivances such as piccotas, motes etc., or by pumps driven by oil engines or electricity, wherever available. Majority of the pumps are, however, installed on open wells, pumping sets being supplied to the cultivators by the Department on taccavi basis and the cost recovered in eight yearly instalments including five per cent interest. Cost of electricity per unit is 6 nP. only and electric pumps are allowed if the owner guarantees a minimum payment of rupee one per h.p. per month. Lift irrigation with the help of diesel pumps does not leave enough margin of profit to paddy growers as the cost in this case ranges from rupees two to four per acre per irrigation. But the cost is reduced to less than half if lift irrigation is managed by electrically driven pumping sets—the cost of electricity being as low as ten annas per acre per irrigation, and only about a rupee per acre, inclusive of all charges on account of depreciation, interest etc.

Compared to the water resources and land available, along the banks of rivers, there is an urgent need for increasing the number of lifts, especially in areas where electricity could be made available. Schemes envisaged to intensify lift irrigation in some of the West-Coast Districts of the State require to be implemented soon so that benefits may accrue at an early date.*

Additional irrigation facilities, generated as a result of the implementation of these schemes, and even if at any time people may find it unremunerative to irrigate paddy crop by lift irrigation, are bound to be fully utilised for other cash crops like coconut, arecanut and cardamom, which are all foreign exchange earners.

23. *Piccota system of irrigation*—Piccota system of lift irrigation, prevalent all over the South, whereby water is lifted by manual labour from wells—two men irrigating about one eighth of an acre a day—is a sharp reminder to the primitive nature of farming in our country and its economy. In one locality the Team noticed in an area of about twenty acres, not less than two dozen wells fitted with equal number of piccotas and each being worked by two men. This means that the amount of irrigation which could be assured by one or two wells costing a few thousand rupees each with one or two pumping sets

*A fuller discussion is included in the Main Report.

costing only a few hundred rupees each and at a recurring cost of couple of rupees on electricity, is now being done by operating at least two dozen piccotas installed on two dozen open wells with a recurring cost equivalent to the wages of fifty men a day. Man power released from this wasteful and out-moded method of irrigation could more profitably be utilised for intensive cultivation of crops leading to increased production. Such primitive methods of irrigation are hardly in consonance with the spirit of the times.

24. *Modification in crop pattern*—Some of the compelling basic facts call for suitable modification in the cropping pattern and dietetic habits of people in the South, as a whole. Firstly, irrigated area in this State is only six percent of the cultivated area. Secondly, there is still some scope for further extension of irrigation in the State, although in the Madras State, there is little scope left for major and medium irrigation projects—sinking of open percolation wells (minor irrigation) involves extremely heavy capital outlay, which in Districts like Coimbatore aggregate to as much as Rs. 30,000 and in some cases even three quarters of a lakh of rupees *per well* so that irrigation water is highly expensive. Thirdly, paddy crop requires abnormal quantity of water and its production is economical only where cheap water is available. Fourthly, because of *excessive bias* in favour of rice cultivation and its consumption, small quantity of water flowing in rivulets or streams for a good portion of the year outside rainy season, as also the sub-soil water readily available at a short depth, are not made use of at present, merely because this water is considered inadequate for rice production although it is adequate for other non-paddy food crops. In fact, large stretches of land all along the rivers as already referred to earlier in the report, remain fallow, as lift irrigation is generally not economical for paddy cultivation and people are disinclined to grow non-paddy food crops. Lastly, even on dietetic grounds, the prevalent bias in favour of rice is not justified, as rice being starchy food, devoid of any protein, is rather an unbalanced diet unlike wheat and ragi which contain both protein and carbohydrate. All these factors together with the changed conditions call for a new outlook in the crop pattern as also in the dietetic habits of the people. Demonstrations of convincing nature may be held by the Agriculture Department to show that production of non-paddy food crops is as paying as paddy or that quantity of water needed for paddy, if used for other crops, would be equally remunerative. Besides progressive farmers may be induced to go in for growing of non-paddy food crops. Revolutionary change is neither expected nor called for, but modification both in crop pattern and dietetic habits to the extent of even 20% can result in immense benefit to all the people.

25. *Co-ordination between Agriculture and Irrigation Departments*—There appears to be considerable scope for greater and more effective co-ordination between Agriculture and Irrigation Departments. This became apparent when the Team observed that expensive pumping equipment worth Rs. 37,000 supplied by the Government free of cost to a co-operative farming

society remained idle, although land, water and other facilities for growing non-paddy food crops were available during the whole period. In the case of anicuts as well, small quantities of water, outside paddy crop season, were not being utilised although several non-paddy crops could be grown. In situations like these, it is the combined effort of both Agriculture and Irrigation Departments that can achieve tangible results.

26. *Maintenance of tanks*—Responsibility for the maintenance of minor irrigation tanks is of the beneficiaries (Ryots) concerned. These customary obligations have not been fulfilled properly and regularly. The maintenance of tanks had thus to be ensured through the Public Works Department, the cost being recovered in instalments from the cultivators. For exercising greater economy and efficiency, it is imperative that the Statute placed on the villagers in regard to the maintenance of these projects should be vigorously enforced. The Team, therefore, recommends that public participation for this purpose should be ensured through Community Development Programme and the necessary funds apportioned by the various agencies in this connection should be pooled and expended through the Panchayats.

27. *Integrated Organisational set up*—Minor Irrigation tanks in the State are under the administrative control of the Revenue Department. All works connected with the maintenance, restoration, improvement and repairs to these tanks are executed by the Public Works Department which is also responsible for buildings and road construction work in the State. The organisational structure and also the procedure involved in the execution of minor irrigation works have many drawbacks such as dual control, avoidable delays in the planning, execution and maintenance of works, lack of adequate attention to minor irrigation projects and difficulties in ensuring proper collaboration between the concerned Departments. The Team considers it of special importance that Irrigation and Agriculture subjects should be dealt with under one Ministry, to develop an integrated and well co-ordinated approach towards the effective utilisation of irrigation potential.

28. Irrigation Engineers should also possess some basic knowledge of agriculture, especially in relation to water requirements of crops and frequency and depth of irrigation as affected by soil, texture and crops.

29. *Dry-Farming*—Considering that (a) irrigated area in the State constitutes only six percent of the total cultivated area, (b) water resources are not available every where, (c) an overwhelming area is undulating and thus not amenable to flow irrigation, (d) annual rainfall, though not too low, is irregularly distributed and (e) agriculturists, by and large, must rely on optimum use of rain water, the problem of dry-farming should have received top priority from the State Government. Peculiar conditions obtaining in the State make it all the more necessary to intensify experimental and demonstration work on dry-farming as early as possible.

10th April, 1959.

N.V. Gadgil
Leader

SUMMARY OF RECOMMENDATIONS

With regard to tanks the Team feels that "Desilting-cum-Reclamation Scheme" would appear to be the most feasible proposition. This implies reclamation of the area under the tanks and utilization of the sale proceeds for carrying out further operations of this character. Successful implementation of the scheme would create an additional cultivable area of about one lakh of acres of fertile land in the State.

2. It is observed that there is an enormous scope for encouraging the construction of a large number of wells all round and within the atchket of the tank to utilise the sub-soil water available near the ground for irrigating dry-farmed lands.

3. A Survey Party should be appointed to survey all areas having shallow sub-soil water and prepare a scheme for economic, expeditious and effective utilisation of sub-soil water for lift irrigation preferably with the use of electricity.

4. Schemes envisaged to intensify lift irrigation in west-coast districts of the State require to be implemented soon so that benefits may accrue at an early date.

5. Change in crop pattern would go a long way to secure economic amelioration of the people. In areas where water is not adequate for paddy, production of non-paddy food crops or other suitable cash crops by irrigation should be encouraged.

6. Public participation in the maintenance of tanks should be ensured through Community Development Programme, and funds should be pooled and expended through the Panchayats.

7. It is of special importance that the Irrigation and Agriculture subjects should be dealt with under one Ministry to develop an integrated and well co-ordinated approach towards the effective utilization of irrigation potential.

8. Irrigation Engineers should also possess basic knowledge in Agriculture, especially in relation to water requirements of crops and frequency and depth of irrigation as affected by soil, texture and crops.

APPENDICES

- I. Terms of Reference—Minor Irrigation Team.
- II. Minutes of the meeting with the officials of the Government of Mysore.
- III. Minutes of the meeting with the representatives of the Government of Mysore.
- IV. Minutes of the meeting with the Ministry of Food and Agriculture.
- V. Statement showing reduction in Irrigated area due to silting of some typical tanks.
- VI. Record of discussions with the Director of Agriculture, Government of Mysore and communication from the Chief Engineer, Irrigation.



APPENDIX I

No. COPP/(4)/17/58
PLANNING COMMISSION
(COMMITTEE ON PLAN PROJECTS)
Reserve Bank Bldg.,
Parliament St.,
New Delhi, August 4, 1958.

FROM

Shri Inderjit Singh,
Joint Secretary, Finance and Secretary, C.O.P.P.

TO

The Chief Secretary,
Government of Madras, Madras /Andhra Pradesh, Hyderabad /
Mysore, Bangalore /Kerala, Trivandrum /Punjab, Chandigarh /
Uttar Pradesh, Lucknow.

SUBJECT—*Team for the study of Minor Irrigation Projects.*

SIR,

I am directed to forward a copy of the Terms of Reference of the Minor Irrigation Team set up by the Committee on Plan Projects. The Team will conduct studies in accordance with these Terms of Reference in your State. *(In order to enable the Secretary of the Team to get in touch with the relevant authorities in the State, it is suggested that a liaison officer may be appointed for this purpose with whom he could maintain contact for such arrangements and facilities as may be necessary for this study).

*For U. P. & Punjab only.

2. The composition of the Team will be as follows :—

- | | | |
|--|-------|-----------------------------|
| 1. Shri N. V. Gadgil | | Leader |
| 2. Shri M. Narasimhaiya | | Member |
| 3. Shri Lal Singh | | Member |
| 4. Irrigation Adviser to the Government of India | | Member, <i>ex-officio</i> . |
| 5. Shri D. S. Borker | | Secretary |

3. The Team has been instructed to associate the local officers with its work. The Leader of the Team will contact the State Government for the name of the official or officials who should be associated with the Team.

Yours faithfully,

INDERJIT SINGH

*Joint Secretary, Finance and
Secretary, COPP.*

TERMS OF REFERENCE OF THE MINOR IRRIGATION TEAM

The minor irrigation projects may be divided for study into two parts :—

- (a) Works already in existence.
- (b) Works which are now being constructed.

2. Case studies should be made of a number of projects of each type under the above headings with a view to judging their efficiency having regard to the objectives with which such works were carried out.

3. The following points should be especially borne in mind :—

Existing Projects :

- (i) The present state of repair and maintenance.
- (ii) The system of keeping works in proper maintenance with particular reference to the customary obligations of villagers for keeping such works in a sound condition from year to year, the team should also examine the extent to which these obligations are enforced, the reasons for the failure to do so and the steps that should be taken to carry out such obligations efficiently.
- (iii) Reasons, if any, for non-utilisation of water by cultivators.
- (iv) Improvements necessary to make the projects more efficient either in the matter of better agricultural planning and practices or in respect of engineering works.
- (v) Cost of restoration if the project is in a state of disrepair and whether it has been included in the Plan.

New Projects :

- (i) Method of selection—procedure and principles on which priorities are based.
- (ii) Flow Chart of the construction Project should be prepared to examine whether any avoidable delay has occurred in its completion.
- (iii) Whether fullest use is made of catchment capacity in preparing designs.
- (iv) Economics of design.
- (v) State of agricultural planning with a view to optimum utilization of benefits.
- (vi) Institutional arrangements provided for the proper maintenance of new works with special reference to the customary obligation of villagers in this regard.

(vii) Costs of actual construction compared to estimated costs—the reasons for increase, if any, and the care with which the initial estimates were framed.

4. Any other matter which the Team considers necessary to report upon having a bearing on economy and efficiency of such projects.

5. The following information should be gathered by the Team for each State, taken as a whole in regard to existing minor irrigation works :—

(i) The total area irrigated from them according to Settlement registers.

(ii) The area actually irrigated from year to year beginning from 1947.

(iii) The reason for the reduction, if any, in the area irrigated.

6. In addition, the Team will carry out a study of the tubewell schemes of the Punjab and the U.P. with reference to the fact whether optimum use has been made of the facilities available by ensuring scientific crop planning and by improving agricultural practices. The study should be based on an examination of individual tubewells, which may be divided into most successful, successful and least successful varieties for the purpose of study. The Team should also select a few tubewells for which alternative crop planning and practices may be recommended that are being carried out at present in order to make them more successful. The consideration mentioned regarding minor irrigation works in paragraph 3 *mutatis mutandis* be taken into consideration for the study of tubewells also.



APPENDIX II

Summary record of the proceedings of the meeting held between the Members of the Minor Irrigation Team and officials of the Government of Mysore at 1500 hrs. on Monday the 16th February 1959 at Vidhan Soudha (Chief Secretary's Chamber) Bangalore.

Present

Shri P. V. R. Rao, I.C.S.,	(in the Chair)
Chief Secretary to the Government, Mysore.	
Shri G. S. Ganapathy,	
Chief Engineer (General), Mysore.	
Shri Lal Singh	} Members, Minor Irrigation Team,
Shri M. Narasimhaiya	
Shri D. S. Borker,	
Secretary, Minor Irrigation Team.	
Shri D. S. Raghavendrachar,	
Dy. Secretary, P.W.D., Mysore.	

1. In response to the recommendations made by the Minor Irrigation Team in its draft report in respect of the Mysore State, the Chief Engineer (General) presented an experimental scheme of desilting-cum-reclamation of five tanks as per the attached list.

2. The Chief Secretary welcomed any scheme offering a solution to the silting problem and supported experimental measures to test the scheme.

3. The Chief Engineer proposed Sulebele and Hebbal Tanks for the purposes of experiments.

4. The Chief Secretary stated that the general policy of the Government is to distribute the land to the landless and therefore it may not be possible to realise the cost of the lands reclaimed, for financing the desilting-cum-reclamation scheme. But that aspect need not affect taking up the schemes as an experimental measure.

5. In reply to a query raised by Shri Borker, the Chief Engineer clarified that the implementation of the scheme at Hebbal would be taken up by the 15th of March and would be completed by the 1st week of July 1959 by means of bull-dozers.

6. The Chief Secretary pointed out the possibility of taking up about ten more tanks in the next season if more machinery and equipment were made available by the Centre.

7. Shri Narasimhaiya stated that the Government of India may make available some machinery for this purpose at least from other projects like DVC etc. The Chief Engineer, however, was of the opinion that such machinery may not be in a fit condition and it may not be possible to depend thereon.

8. Shri Narasimhaiya suggested that Investigation Circles to be formed, may go through the possibility of reconditioning the existing tanks by adopting this method and the Chief Secretary agreed to this suggestion.

9. Shri Lal Singh pointed out the desirability of calling upon the Army Surveyers to help to carry out the survey for the purpose and the Chief Secretary offered to follow up this suggestion even though the Army Survey may cost five times more.



MYSORE PUBLIC WORKS DEPARTMENT

*MAIN—DETAILS

OFFICE OF THE CHIEF ENGINEER (GENERAL) BANGALORE

S. No.	Details	Danapur tank of Doddadasarahalli	Sulebele Chikkere	Chundenapur Gangachetty tank	Bommasandra tank	Hebbal tank
1.	Atchkat under the tank	40 acres	432 acres	11 acres	114 acres	163 acres
2.	Existing Capacity	13.95 units	26.5 units	30.00 units (Tank Register)	30.24 units (As per Tank Register).	197 units
3.	Water spread area at the F.T.L. at present	26.23 acres	87 acres	44 acres (Tank Register)	56 acres (Tank Register).	184 acres
4.	Water spread area after raising the waste weir.	36 acres	115.48 acres	36 acres at present	48 acres at present.	—
5.	Cost of Restoration in the normal procedure.	Rs. 21,000	Rs. 78,500	—	Rs. 23,000	—
6.	Water spread area as per desilting-cum-reclamation scheme.	27 acres	75 acres	23½ acres	40 acres	14½ acres
7.	Cost of desilting-cum-Restoration Scheme	Rs. 57,500	Rs. 1,16,000	Rs. 22,000	Rs. 42,000	Rs. 53,000
8.	Capacity after desilting-cum-Restoration	26.23 units	42.50 units	24.58 units	35.6 units	200.89 units
9.	Acreage reclaimed	5.6 acres (9—3.4)	32 acres (115—75.8)	18 acres (21½—3½)	14 acres (16—2)	34 acres. (43—9)

*These figures are subject to possible modification by Government of Mysore.

Chief Engineer (General)

APPENDIX III

Summary record of the proceedings of the meeting with the representatives of the Mysore Government held at 1000 hrs. on Tuesday, the 17th February 1959 at Vidhan Soudha, Bangalore.

Present :

Shri N. V. Gadgil,
Governor, Punjab and Leader of the Team.
Shri B. D. Jatti,
Chief Minister, Mysore.
Shri T. Mariappa,
Minister for Finance, Mysore.
Shri M. N. Nagnoor,
Deputy Minister, P.W.D., Mysore.
Shri P.V.R. Rao, I.C.S.,
Chief Secretary, Mysore.
Sardar Lal Singh,
Member, Minor Irrigation Team.
Shri M. Narasimhaiya,
Member, Minor Irrigation Team.
Shri M. P. Mathrani,
Member, Irrigation and Power Team.
Shri Mallaraja Urs,
Director of Agriculture, Mysore.
Shri D. C. Ragavendrachar,
Deputy Secretary, P.W.D., Mysore.
Shri D. S. Borker,
Secretary, Minor Irrigation Team.

Initiating the discussions Shri N. V. Gadgil emphasized the need for more food production through the development of minor irrigation. The Minor Irrigation Team had undertaken a study of the problem in a few States, viz., Andhra Pradesh, Madras, Kerala and Mysore. It was found that the land submerged by the irrigation tanks was almost equal to the area irrigated by them. In spite of the fact that considerable silting had taken place, desilting operations had not been carried out. He mentioned that Madras had made a modest beginning in this direction. To meet the situation, the Leader favoured limiting the area of submergence through (a) deepening the tanks and (b) reclaiming the foreshore area by dumping the

silt excavated, as proposed by Shri Lal Singh. He referred to the proposal of raising of bunds which was suggested at one stage, but he apprehended that this might lead to further submergence. In the circumstances the Team's proposal to desilt and reclaim the submerged area merited serious consideration.

2. The Leader further stated that there were 35,000 tanks in Mysore State and they irrigated 5.6 lakh acres and submerged nearly as much area. There was no firm estimate of the cost of desilting and reclamation available, however if found self-supporting the scheme could be extended to cover all tanks. He suggested that while assessing the returns on the investment the additional food output should also be taken into consideration.

3. Shri T. Mariappa, Finance Minister, Mysore pointed out that they had tried only desilting of tanks in the State which had proved very costly. At this stage, Shri P.V.R. Rao, Chief Secretary, Mysore explained that the present proposal of the Team involved reclamation of the foreshore lands which would have otherwise submerged. The Finance Minister gave instances where cultivation had been extended right up to the edge of water supplies. He also referred to the efforts made to arrest silting by putting up bunds across the tributaries.

4. Shri Lal Singh clarified that the remedial measures proposed in the Draft Report were evolved only after discussion with the State officials. He pointed out that at the time when the tanks were originally constructed, the prices of agricultural produce were low ; there was no population pressure and little scientific advance. Now the loss through evaporation alone ranged between 74 inches to 170 inches per annum or 90 inches on the average. On the basis that about 12 inches of water were required for a crop like wheat, the loss due to evaporation was equivalent to a loss of 7 acres of irrigation for every acre of tank surface. This waste had to be curbed by reducing the areas of exposure. In the present conditions with high population pressure, it was necessary to make most of the available resources. Referring to the Madras practice of dumping silt on private lands Shri Lal Singh pointed out that it would be much more economical to deposit the same on the fringe of the tank bed itself where there was shallow spread of water. This practice, if adopted would be beneficial in more than one direction, firstly it would reduce the leads, secondly it would reduce the area of tank surface besides making available extra land for cultivation. This extra land which is generally very costly can be sold and thus help to provide the necessary finance for desilting. On the assumption that even if 15 percent of the submerged land could thus be recovered it would add a lakh of acres of cultivable land in Mysore alone. If the self-supporting nature of this proposal could be established the scheme could be extended to other areas. On the other hand, if the operations were confined to desilting only it would be very expensive and prove to be uneconomical.

5. Shri Lal Singh further pressed the necessity to stop erosion of the foreshore lands by resorting to plantation of Bermuda grass etc. In reply to a query from the Leader regarding the steps already taken by Mysore Government, Shri Mariappa, Finance Minister stated that putting up of bunds across the tributary courses was adopted. There were about 1,000 tanks on the river Palar which were fairly well looked after by the people but in recent years, there was a general tendency to neglect their upkeep. The tank beds were being continuously encroached upon. Therefore, he heartily welcomed any method to preserve such tanks provided they were useful. He also referred to the practice of providing silt-traps which had been tried in the State but not very systematically. He mentioned that majority of the tanks were under the control of the Revenue Department while some were looked after by the P.W.D. The P.W.D. would not undertake repairs to the tanks unless the villagers paid the cess which they were reluctant to do. Therefore the maintenance of the tanks was neglected and silting continued. The Team's proposal to reduce the area of tanks was really a very useful one. He doubted the feasibility of planting grass etc. as he thought the people were generally careless and could not be expected to look after grass plantations. At this stage Shri Lal Singh pointed out a specific variety of grass which could withstand all sorts of rough conditions.

6. In reply to a query from the Finance Minister, Mysore regarding the agency to look after the grass plantation, the State Director of Agriculture stated that his department would not be able to take up this additional task as the posts of his field staff at the ground level (Mukaddams) were to be converted into those of Village Level Workers. He suggested that this work could well be entrusted to the Panchayats.

7. The Chief Secretary referred to the five tanks proposed as part of the experimental scheme and stated that the Hebbal tank might be completed during March-July 1959. This scheme envisaged recovery of 34 acres of land by increasing the tank capacity from 197 to 201 units at a cost of Rs. 53,000 proposed to be provided from N.E.S. budget. The Finance Minister remarked that if the Planning Commission could assist in securing more grants, further schemes could be taken up on the same lines.

8. Shri Lal Singh referred to certain areas which were affected by water-logging due to heavy irrigation while the lands higher up were starved for water. He stressed the desirability of adopting lift irrigation to improve matters and further proposed that a small Committee be appointed to find out the affected areas and to suggest remedial measures. This was agreed to.

9. Shri Lal Singh deprecated the habit of growing paddy only. Since a crop like Jowar needed only 24 inches of water as compared to paddy which required 72 inches, it should be possible to grow more jowar than paddy. A diversification of crops would also be conducive to achieve a better balancing of diet of the people.

10. The Chief Secretary, Mysore Government stated that the State will need help in the form of machinery in the next season when more tanks were proposed to be taken up. Shri N. V. Gadgil remarked that the Planning Commission will have to be approached for such assistance. He thought that normally there should be no difficulty in securing the necessary machinery and suggested that the details regarding the number and types of machines required should be worked out.



APPENDIX IV

Summary record of the proceedings of the meeting with the representatives of the Ministry of Food & Agriculture held at 1130 hrs. on Tuesday the 3rd March, 1959 in Secretary's Chambers, Krishi Bhavan, regarding Minor Irrigation Works in Southern States.

Present :

1. Shri K. R. Damle, ICS., (in the Chair)
Secretary, Food & Agriculture Ministry
(Deptt. of Agriculture).
2. Shri Krishan Chand, ICS.,
Joint Secretary, Ministry of Food & Agriculture.
3. Shri Inderjit Singh,
Joint Secretary, Finance and
Secretary, Committee on Plan Projects.
4. Shri Lal Singh,
Member, Minor Irrigation Team.
5. Shri Jagat Kishore Jain,
Asstt. Irrigation Adviser, (Food & Agri. Ministry).
6. Shri D. S. Borker,
Secretary, Minor Irrigation Team.

Sarvashri Inderjit Singh and Lal Singh explained the salient features of the scheme and the main considerations for suggesting that it should be undertaken, particularly the conservation of financial resources.

2. The interim Report as presented by the Minor Irrigation Team of the Committee on Plan Projects was further discussed and Shri K. R. Damle expressed the view that the Ministry of Food & Agriculture were in agreement with the general approach and the methods suggested for desilting-cum-reclamation of the tanks on more or less a self-financing basis. Shri Krishan Chand mentioned that the Madras Government has also taken up a similar scheme on an experimental basis.

3. Shri Inderjit Singh suggested that the papers may also be shown to the Minister for Food & Agriculture and they will be glad to furnish such further explanation as the Minister may desire. Shri K. R. Damle promised to do so.

APPENDIX V

**Statement showing Reduction in Irrigated Area due to silting of some Typical Tanks in Bangalore North Taluk, Bangalore District*

S. No.	Old Reg. No.	Name of Tank	Hobli	Year for which oldest record available	Atchkat in acres			Atchkat for 57-58			REMARKS
					Wet	Garden	Total	Wet	Garden	Total	
1.	234	Challahalli Tank Bhimanakere.	Hesaragatta	1907 Tank Reg.	63	3	66	37-07	20-18	57-25	
2.	185	Sadanahalli Tank ..	"	"	59	4	63	2-36	3-27	6-23	
3.	230/231	Addeviswanathapura Tank	"	"	106	3	109	90-00	3-12	93-12	Atchkat figures of the tanks for 1957-58 are obtained from Revenue Department.
4.	166	Kadathamala Tank ..	"	"	26	3	29	14-12	4-01	18-13	
5.	223	Dibbur Tank ..	"	"	35	—	35	23-12	7-20	30-32	
6.	277	Mylappana Hally Urumundinakere.	"	"	39	—	39	59-23	6-16	65-39	
7.	135	Abbigere Tank ..	Yeswanathapur	"	42	47	89	11-00	35-30	46-30	
8.	137	Banavarakere ..	"	"	161	4	165	82-01	4-19	86-20	
9.	151	Karihobanahalli Narasappana kere.	"	"	49	44	93	41-26	44-38	86-24	
10.	106	Jakkur Tank ..	Yelahanka	"	100	3	103	74-20	22-13	96-33	
11.	128	Agrahara Tank ..	"	"	25	—	25	29-28	8-01	37-29	

(Sd)

Chief Engineer, Irrigation and Public Health.

*Chief Engineer's D. O. Letter No. 976/GI addressed to Secretary, Minor Irrigation Team.

APPENDIX VI

Record of discussions with the Director of Agriculture, Government of Mysore, held on December 27th and 28th, 1958 at Bangalore.

Present

Shri M. Mallaraj Urs, Director of Agriculture, Mysore.

Sardar Lal Singh,

Shri M. Narasimhaiya,

Shri Mahavir Prasad,

} Members, Minor Irrigation Team.

1. The Members of the Minor Irrigation Team explained in detail all the points and emphasised that "Desilting-cum-Reclamation Scheme" offers great promise of success. But it will be desirable to carry out the experiment first in a selected number of representative tanks in various parts of the State in order to work out the economics of "desilting-cum-reclamation", to gain experience in work, and to allay fears expressed in some quarters that removal of silt from the tank may adversely affect the imperviousness of tank-bed.

The Director of Agriculture particularly emphasised the need of making desilting-cum-reclamation scheme a comprehensive and integrated one, in order to prevent further resilting of tanks after they are desilted, and to prevent soil erosion in the foreshores of the tanks, which could be brought about by close collaboration between the concerned Departments, namely, Agriculture, Irrigation and Forest. He also stressed the need for the Forest Department to put in any kind of trees, preferably remunerative trees like cashewnut, in the valleys to check soil erosion and thereby silting of tanks.

2. In places where water storage capacity of the tanks is urgently required to be increased, the scheme of desilting-cum-reclamation can be modified to the extent that (a) besides reclaiming certain portions of the tanks, the waste weirs may be raised to increase the water storage capacity of the tanks and (b) in order to prevent soil from being washed down again into the tank, contour banks of 3-4 ft. height may also be put in and properly pitched.

3. The Director of Agriculture particularly emphasised the need for intensifying soil conservation practices with which the Team agreed completely.

4. As regards the disposal of reclaimed lands in the tanks which in the opinion of the Team could be either sold to recover the cost on reclamation,

or leased out or given to the Agriculture Department for various purposes, the Director of Agriculture was strongly of the opinion that such lands should be converted into pastures, and covered with suitable kinds of grasses under the guidance of Agriculture Department and properly maintained by the Village Panchayats. These pastures, in his opinion, are necessary for the development of Animal Husbandry and more particularly Dairy Industry. The Team had no objection to this suggestion, as it was a matter for the local authorities to take necessary action on the utilization of reclaimed lands.

5. The Director of Agriculture agreed with the recommendation of the Team for greater utilisation of sub-soil water than has been the case so far, which could be done by sinking a very large number of percolation wells in and around the atchkets of various tanks, where water is readily available at short depth from the ground surface and can be economically lifted to irrigate lands, now under dry-farming.

In this connection a Survey Party is required to be appointed immediately to survey all areas having shallow sub-soil waters and to work out the total number of wells required, area capable of irrigation, and total cost involved etc.

6. In the case of tanks which are completely silted up, people may be encouraged to sink open wells to utilize both land and sub-soil water now going waste. In connection with the digging of percolation wells, the Director of Agriculture particularly referred to the mobile "Well Digging Equipment", which he had seen in California and which could dig wells at comparatively low cost. In his opinion one equipment per Tehsil would immensely expedite the work on an extensive scale and the scheme could be easily self-supporting.

7. He agreed with the observations of the Team that piccota system of irrigation was immensely wasteful of time, energy, money and land, and requires to be replaced as early as possible, which could be done by encouraging the people to go in for pumping sets or at least efficient persian wheels. Sardar Lal Singh referred to an improved type of Rahat (Persian Wheel) worked by bullocks and capable of lifting more water than persian wheel, being tried in one of the Districts of U. P. The Director of Agriculture desired to give it a trial under Mysore State conditions.

8. The observations and recommendations of the Team on the need or utilising waters of streams or rivulets, now going to waste, for irrigating lands on the flanks of these rivers were agreed to.

9. Since lift irrigation is possible only for non-paddy food crops or plantations and it is uneconomical for paddy crops, it is necessary to reduce the cost of lift irrigation by providing electricity. The schemes prepared by

Irrigation Department, particularly in South Kanara and Coorg Districts, and supported by the Team, deserved to be sanctioned at an early date. In this connection the Team feels with which the Director of Agriculture agrees, "in every Electric Power Generation a certain percentage must be set apart for agricultural purposes, particularly so because of the conditions prevailing in Mysore State where a large area of land is now under dry-farming and water is available at short depth for lift irrigation."

10. The Director of Agriculture agreed with the observations of the Team in regard to the necessity for suitable modification in the crop pattern as also in the dietetic habits of the people. He agreed with the proposal of the Team to have a large number of demonstration plots all over the State for growing non-paddy food crops and to work out the economics of the same as a demonstration to the people. But he laid emphasis on the need of linking the production of non-paddy food crops with market facilities, as in his opinion it was the lack of market facilities which considerably discouraged the production of non-paddy food crops.

11. As regards the observations of the Team for greater co-ordination between the Agriculture and Irrigation Departments, the Director of Agriculture stated that the State Government had under consideration a proposal to attach an Agricultural Officer with the Chief Engineer (Irrigation) for liaison between the two Departments. He also appreciated the suggestion of holding a short course of six weeks' duration for Irrigation Officers to acquaint them with Crop Husbandry in relation to irrigation practices. The two Agricultural Colleges in Mysore State would be able to arrange such reorientation courses. This practice had proved immensely useful in West Punjab (now Pakistan).

12. Recommendations of the Team for intensifying experimental and demonstration work on dry-farming in view of peculiar conditions obtaining in Mysore State were also agreed to.

COPY OF THE D.O. LETTER NO. 16847/GI DATED THE 31ST DECEMBER, 1958
FROM THE CHIEF ENGINEER, GOVERNMENT OF MYSORE TO
SHRI LAL SINGH, MEMBER, MINOR IRRIGATION TEAM.

"With reference to discussion that was held on 28th instant at my house between Minor Irrigation Team and myself, I have gone over in detail the digest of your Report. I am in general agreement with the recommendations made in the Report.

In regard to special subject of "Desilting-cum-Reclamation Scheme" which is of big magnitude, I would like to have a detailed discussion with my own staff as early as possible. In the meantime, I agree with the suggestion of the Team that it is desirable to carry out experiment at least in selected number of representative tanks in order to work out the financial and other implications of the same and to gain experience in the work."

MIPC-1000-13-5-59-GIPF.



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MAP OF MYSORE STATE SHOWING IMPORTANT IRRIGATION WORKS

- ▲-- CONTINUING SCHEMES FROM
THE FIRST PLAN
- NEW SCHEMES OF
SECOND PLAN



