CHAPTER X

SUMMARY AND CONCLUSIONS

In many parts of India and certainly in the preponderantly 'dry' regions of Maharashtra, water being the scarcest factor in agriculture - even scarcer than land - it is necessary to use it most economically so that from the social point of view, the net output due to water is maximised. The project analysis techniques help in identifying the irrigation projects which render maximum return to the growth of the economy as well as to capital contributed by the participants. Therefore, proper economic evaluation of irrigation projects is of prime importance in the State.

However, the recent discussions on the criterion for the economic evaluation of irrigation projects and a review of this literature, as undertaken in Chapter II, bring out two important points: (1) The method of estimating the social benefits and costs, and consequently the procedure for calculating the benefit-cost ratios of the irrigation projects adopted in India in official as well as in many non-official studies suffer from some inconsistencies and errors. (2) Moreover, the exclusive concern with social cost-benefit analysis has resulted in attention not being given to the possibility of financial returns to the investment in the projects, as also to the possibility of
different types of farmers being able to bear the cost of irrigation. In the present context, therefore, it is of some interest to review the current method of economic evaluation of irrigation projects in India and design a proper criterion for the study of financial profitability and the social cost-benefit of the proposed irrigation projects.

In view of the very limited water resources over the large parts of Maharashtra and the necessity to make it available for agriculture at the quickest, great emphasis has been put on lifting water from rivers and streams with the help of pumps. It is, however, felt that though there are some advantages of the lifts over the other sources of irrigation, the execution and functioning of these projects have in many instances, been highly unsatisfactory. Under the circumstances, it is necessary to examine the possible economics of a few such schemes to highlight the problems faced by them.

Thus, the major objectives of the thesis are two fold: Firstly, to estimate the financial profitability and the social cost-benefit of some lift irrigation schemes by improving upon the methodology adopted by most of the studies in the country so far, and secondly, to study the problems associated in the formulation and implementation of the lift irrigation schemes in Maharashtra.

A total of five lift irrigation schemes - four from
Haveli Taluka of Pune District and one from Khandala
Taluka of Satara District - were selected purposively for
the study. The data required for the study were collected
by the farm survey method and related to the year 1972-73.

In the financial profitability calculus, while esti-
mating the economically efficient crop patterns, using
the usual budgeting method, under the lift irrigation
schemes, we found that given the capacity of the pump put
up and the irrigation duty of various crops in the region,
sugarcane turned out to be the most profitable crop com-
pared to any single crop or combination of crops. The other
crops came into the planned cropping pattern because the
limit to area under sugarcane was put by the area under
this crop that could be irrigated with the pumping capacity
of the lift and the failure of the electricity in summer.
Thus, the other crops used only the surplus pumping capacity
of the lift in the kharif and rabi seasons. The same
estimation of crop pattern is also attempted with the help
of linear programming technique by using the Simplex method.
It is seen from the results that the optimal crop pattern
obtained in the linear programming method tallies with
the economically efficient crop pattern estimated by us
under irrigation.

However, the estimated crop pattern under the project
does not necessarily tell us what is the most economic use
of a given quantity of water that may be available for
irrigation. For, it is also pointed out that given the water discharge capacity of the pump and considering the three seasons together, sugarcane will use much more irrigation water than any alternative individual crop or combination of crops. Therefore, to know the best economical use of the total quantity of water used to irrigate sugarcane, a different approach is necessary. If the given pumping capacity cannot pump the total quantity of water used under sugarcane for seasonal crops because of the interval in which irrigation water is required for those crops, then the pumping capacity would have to be increased. Besides, the total water used for sugarcane over the three seasons can also be given to seasonal crops in kharif and rabi if the irrigation water is supplied from a reservoir. This would, of course, require even greater installation of pumping capacity, larger command area under the irrigation system, as also longer and wider water distributory channels over the area. Therefore, while the alternative returns to the given quantity of water may be higher than calculated in the planned cropping pattern for the given water discharge capacity of the pump, the costs may also be higher and the net profitability of the alternative use of irrigation water has to be accordingly worked out. We have undertaken this exercise by taking one of the five lift irrigation schemes under study, as an example, to which we shall turn subsequently.
It is observed in the financial analysis that all the five schemes selected for the study are financially profitable and give the internal rate of return in between 42 and 82 per cent. These lifts also prove to be profitable even under the assumption that if the net increase in crop production after irrigation is 10 per cent lower than what has been estimated by us, then the rate of return on the investments will be in the range of 34 to 64 per cent.

The financial analysis is extended to the repayment of loans after improving upon the general practice of the financial institutions in the country in prescribing the repayment schedule and considering the repayment capacity of the farmers.

The present repayment schedule followed by the financial institutions in the country often fails to take into account the lapse of time after the disbursement of the loan before the benefits begin to accrue to the cultivators. This results in enforcement of repayment on some farmers who have not been able to avail of irrigation facility for some time because of delays on account of technical or financial reasons like land development, etc. This is not proper. To overcome this common weakness, it is proposed that the total amount of principal to be repaid should be distributed among the farmer-members on the basis of their area to be irrigated every year from the beginning and the period over which such benefits would accrue to them.
The proposed repayment schedule gives some relief to the farmers who begin receiving irrigation water late in two ways: relief in the total amount of principal to be repaid, and the necessary staggering in the period from which the first instalment would be due from them. From this point of view, the proposed repayment schedule would be more equitable than the present schedule prescribed by the financial institutions in the country. On the other hand, some hardship may be caused to the farmers who begin repayment late because they will have to repay the total loan in a few years than stipulated by the bank or even in a single year. It may, however, be noted that the proposed method of repayment may act as an incentive to the farmers for earlier utilisation of irrigation.

It is found in the repayment analysis that all the farmers in the different size groups of land holdings in each project can repay the loans in the period stipulated by the banks. In the case of farmers in small size groups of land holdings, it is, however, essential to postpone the date of repayment of the first instalment of loan till they acquire the necessary repayment capacity. On the other hand, the repayment capacity of the farmers in big size groups of land holdings is so high as to justify a substantial reduction in the total period of repayment stipulated by the banks. These calculations would also help the financial institutions to estimate the period over
which they can reasonably expect to recover the loans from the farmers and decide whether any flexibility in this regard is necessary.

From the viewpoint of the social cost-benefit analysis, it is observed that all the five lift irrigation schemes are economically feasible and give the benefit-cost ratios in between 1.42 and 1.72, and the social rate of return on the investments in the range of 42 to 77 per cent. Like in the financial analysis, if we assume that the net increase in crop production is 10 per cent lower than that has been estimated by us, then the ratios will be in between 1.33 and 1.55 and the rate of return in the range of 34 to 59 per cent. Thus, examination of the estimates shows that all the lift irrigation schemes are not only financially feasible but are also justifiable in terms of social cost-benefit analysis.

The question of most economic use of the given quantity of water, as mentioned earlier, is examined by taking one of the five lift irrigation schemes, viz., the Koregaon-Mul lift irrigation scheme in the Haveli Taluka, as an example. The total quantum of water that would be used by this project under the planned cropping pattern in a year is considered to be available for irrigation in kharif and rabi seasons or in eight months. Given the total quantity of water available for irrigation, the question is about its division between the kharif and rabi seasons. A large
number of alternative possibilities are open for this purpose. We have worked out the economics of two alternative divisions of the total water available for irrigation. One division is to use the total water between the two seasons in such a way that the pumping capacity can be fairly fully used in each season. The other is to make half of the total water available in each of the two seasons. In this analysis, we have considered five crops in the kharif and four crops in rabi seasons giving ten alternative possible crop combinations and worked out the economics of each crop combination in two of the most likely alternative divisions of the total water available for irrigation.

In both the alternative divisions of the total irrigation water we find that if all the water used by the existing project under the planned cropping pattern is to be used in kharif and rabi seasons to grow seasonal crops over a much wider area and so covering a large number of farmers, with the help of larger pumping capacity, the economics of such water use would be much better than the one based on the given area and the given pumping capacity where sugarcane becomes a dominant crop. The best economic use appears to be kharif onion and rabi wheat giving about twice the net present value than that under only sugarcane. It covers about seven times the area that will be irrigated under sugarcane, and about twice the net area that will be irrigated as per the planned cropping pattern.
worked out under the existing project. The number of beneficiaries will also be proportionately larger.

This exercise would enable us to look forward at the larger question of the best use of canal water in the water-scarcity regions of Maharashtra. In the lift irrigation scheme under examination, use of the total volume of water in kharif and rabi seasons without sugarcane would increase the total net irrigated area to at least two times than what it is presently worked out to be. Even the present use under the lift is much larger for the seasonal crops because of the given capacity of the lift and the failure of electricity in summer. Otherwise, the net irrigated area would be even much smaller. For a canal irrigation system primarily designed to meet the needs of sugarcane, the increase in area under seasonal crops would be much larger than the two-fold increase observed in this analysis, if the water of the reservoir is given exclusively to seasonal crops in kharif and rabi. This alternative is of primary importance to Western Maharashtra facing severe shortage of water and uncertainty of yields. To be sure, the questions that are raised in this context are complex: the questions of larger capital cost involved in covering wider area under seasonal irrigation; the existing industrial structures based on large tracts of sugarcane area under canal irrigation, etc. These issues need careful study and examination. But undoubtedly there is a strong economic case for a
different pattern of use of irrigation water from reservoirs than has been hitherto followed. Also the study makes it clear that the present practice does not lead to the most economic use of water from the social point of view. It may be noted that the alternative use of irrigation water may act as a spur to use more and more underground water in the command areas of the canal irrigation projects because for the farmers who want to continue to grow sugarcane, underground water would be the only alternative left out.

The problems of the lift irrigation schemes in Haveli Taluka were of three types: (1) Delay in the construction of schemes, (2) delay in the full utilisation of irrigation potentials; and (3) delay in the repayment of loans.

The major problems in timely completion of the four schemes in the Haveli Taluka were inadequacy of the necessary finance and improper planning from the very beginning. The State Government which came forward to promote the irrigation activity did not give any attention to the extent of funds required for the schemes and their feasibility while advancing the loans. At the same time the Federation which executed the schemes was also unmindful of the necessity of properly formulating the schemes, and estimating the financial requirements. Further, the farmer-members remained as mere passive beneficiaries without showing any initiative and interest. The entire initiative was taken by some political-social workers who organised the Federation
and took all the initiative and interest in the projects. However, they had many other preoccupations and depended more on their political strength rather than on the technical and financial feasibility of the schemes.

The important problem in full utilisation of irrigation is levelling and making the land suitable for irrigated farming. In the case of projects in the Haveli Taluka the work of land development was considerable. As no land levelling machinery was available, the entire work was to be carried out by the farm labour. Moreover, it was possible to undertake this work only when bullocks and men were free from crop production work, and that was possible only in summer. Thus, the time available for the work every year was too short to complete the entire work sooner than in the estimated period. Besides, in the very nature of things, full utilisation of irrigation reaching its stage of maturity is a slow process.

Absence of stiff conditions compelling the farmers to repay the loans to the bank in Haveli Taluka resulted in the wilful default in repaying the loans by the farmers. In contrast, we see the farmers in Bhade village complying with the conditions laid down by the Nimbkar Company and repaying the loans in time.

Many lift irrigation schemes in the State are reportedly not functioning efficiently. The reasons identified
above go a long way in explaining this. Hurried and inadequate formulation of the lift schemes with whatever finance is immediately available results in prolonging the period of construction. Improper or inadequate arrangement for land development further delays the commencement of irrigated farming. Absence of built-in-conditions which will make the farmers see the necessity and usefulness of timely repayment is another source of not merely failure of financial institutions from recovering their funds, but also far tardy and negligent development of irrigated farming by the farmers. And finally, what is required is involvement of farmers in the formulation and execution of schemes, where they feel they have a stake and something to lose for their failures. Charitable outsiders are poor substitutes for this.