CHAPTER 8

SUMMARY AND CONCLUSIONS

Third World irrigation needs new technology coupled with better management to improve efficiencies. Efficient operation and management of the system requires information flow from both ends: system manager to farmers, that is, top-down approach and from farmers to system manager, bottom-up approach. Information is crucial for providing a reliable, predictable and equitable delivery of water and responding to the feedback information from the field on a real time basis. The present study has aimed at improving the operational performance of the system through a Management Information System.

Focus has been on developing an MIS for operational level management of the irrigation system concerning water delivery. It is the need for structured decisions, quick and tangible results in the operational against the tactical and strategic levels has prompted the MIS at the operational level. An MIS has been developed for the Sathanur Irrigation System across the River Ponnaiyar in Tamil Nadu in India. This system is a water shortage system, where there is a great need for efficient use of water.

8.1 SUMMARY

A performance oriented diagnostic study has been undertaken in association with the irrigation agency. This has involved the study of the physical system, the organisation, the operation and management, interviews and discussions with the agency and farmers at different points
of time in the research study, field observations, analysis of water
distribution and farmers' responses. The diagnostic study has been
undertaken to understand the existing level of performance of the system
and to identify the critical managerial activities influencing the system
performance.

The diagnostic study has revealed both the constraints and
deficiencies in planning, operation and management of the system. The
water distribution analysis in the last three seasons have shown that there
existed an inequity in water distribution both at the macro level (among the
distributaries) and at the micro level (among the minors). The reliability of
the water delivery services has not been upto the desired level. The reasons
for inequity and low reliability have been found to be:

(i) Due consideration has not been given to the losses occurring in
the canal network, when planning for the water delivery
schedule.

(ii) There has been a difference between the crops planned and the
crops grown.

(iii) The sluices in this system have been designed based on
water duty concept (that is, 1/a/ha or number of hectares that
can be irrigated with unit quantum of water). There has also
been a change in the water distribution procedure from
continuous supply to rotational supply at the distributary level
under the New Operational Plan. The additional technical
expertise and guidance required by the personnel for planning
and implementing the rotational water distribution in such a
duty based systems have not been provided so far.
(iv) The existing operation and management procedures do not have an inbuilt mechanism for monitoring and evaluation with a feedback information system.

The performance diagnosis has eventually helped to identify the three critical activities below:

* Water Scheduling for rotational distribution
* Operation of the distribution system for rotation and
* Monitoring and evaluation of the system

The MIS has been developed to eliminate the deficiencies in the existing scheme of operation and management. This model is developed using the **concepts of management information system and irrigation system performance**. Accordingly, the MIS has been developed with three functional modules namely, **Planning, Monitoring and Evaluation**, taking into account the three critical activities above. Additionally, a **Data Entry** module has been provided for towards inputting the data required for the functional modules.

* The **planning module** computes the demand of each distributary canal starting from the downstream outlet and prepares the water delivery plan for various allocation options. A new computational procedure has been developed for scheduling the rotations among the distributaries.

* The **monitoring module** helps to regulate the water delivery with a timely response to the field conditions in a systematic manner.

* The **evaluation module** computes the various performance indicators and provides a synoptic view of the seasonal
performance of the system. It also provides guidelines for the system manager and the operational staff to upgrade the system operation, subsequently. The module serves, in addition, as a public documentation which allows farmers and others to judge how the system is performing.

The results of the MIS have shown that there exists a potential for improving the performance of the system as follows:

(i) By using the planning module, the inequity in water distribution among the distributaries has been reduced from a deviation of 76 per cent to that of 19 per cent in the LBC and 50 per cent to 17 per cent in the RBC (as indicated by MIQR of 1.76 (existing scheduling) and 1.19 (model) in the LBC; 1.50 (existing scheduling) and 1.17 (model) in the RBC). Also, it is clearly seen that the reliability of water delivery services can be upgraded from the present level of coefficient of variation of 0.20-0.25 to the level of coefficient of variation of 0.05.

(ii) The performance of water delivery among the distributaries can be improved to the range of DPR of 0.95 to 1.05 from the present range of DPR of 0.85 to 5.90 in the LBC. It can be improved to the range of 0.80 to 1.15 from the present range of DPR of 0.80 to 4.80 among the distributaries in the RBC. The model reduces not only the deviation but also helps to improve the resource use efficiency by regulating the excess delivery in a few distributaries.

(iii) The timeliness of meeting the crops' needs and the equity in distribution among the minor outlets (micro level) could be better achieved with the MIS. Although, there is no availability of data to compare and show them, quantitatively, for all the
distributaries and outlets on an overall basis, illustrations and discussions have been made, wherever possible to show the potential of this tool as against the existing planning procedure.

(iv) With the present computational procedures, the MIS is capable of analysing the water delivery performance and updating the operational plan in case of deviations observed in the field in a systematic manner, as the functional modules are designed to work concurrently.

(v) The water delivery performance analysis coupled with the farmers’ perceptions on water delivery provides an accountability for the services provided by the staff.

In essence, the MIS could enhance the

(a) decision-making process
(b) quality of water delivery services provided by the irrigation agency in satisfying the farmers’ needs
(c) efficiency of resource utilisation with timely information and
(d) accountability for the staff involved.

8.2 SCOPE OF THE MIS

The MIS can also be used as a training tool towards improving the skills of the system manager and operational staff. The research study on MIS in irrigation system has demonstrated that to develop an effective MIS for an irrigation system or irrigated agriculture system, in-depth and comprehensive fieldwork is essential, so as to understand the complexities of the irrigation system.
8.3 SCOPE FOR FURTHER STUDY

Nevertheless, the availability of this tool alone cannot bring the desired level of performance. It requires motivation and interest on the part of the irrigation personnel as well as incentives to the staff for showing such an involvement. It requires additional communication facilities and coordination to acquire and provide timely information. Parallel changes in other management conditions such as human resource management, management training and changes in organisational procedures are to be made in a coordinated manner, to improve the efficiency and reach of the targets and fulfil the overall objectives of the system.

The MIS is developed for an irrigation system with a main focus on water delivery system. Thus, it considers only a single resource, that is, water. It has been shown that there exists a great potential for improving the resource use efficiency and effectiveness in satisfying the clients' needs. The MIS concept can be extended to the farm level operations (micro), considering human, finance and material resources, in addition to water. This micro level MIS could help in the sharing of the various resources between different farms. Similarly, the MIS concept can be applied to the various irrigation systems and other concomitant users for sharing the resources in any river basin.

National Water Policy of India and the State Water Policy of Tamil Nadu recognise the need for developing MIS. The present research and development of the MIS could help to demonstrate the potential and enhance its value in inducing the authorities to use the same at all levels of management.