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Application of IT for Canal Automation in Existing Irrigation Projects and Futuristic Planning Based on Grassroot Level Study.

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Abstract of Paper :

The subject matter of my Paper is gathering momentum rapidly, in view of the noticeable progress in the field of Information Technology /Computerization. The Paper deals with the subject keeping in view the futuristic Water Resource needs , based on social aspects, rapid growth in Urbanization, Industrialization and basic requirement for Irrigation in the field. This has been linked up, with the concept of River Basin Organizations.

Keywords / Keynotes:

Computerised Canal Automation for Irrigation Projects vis-a-vis- River Basin Organizations-Futuristic Planning IWRS- Oral PP Presentation at Beijing Conference (ICID),Sept.2005,Q.No.52.6 Author:Er.Suresh Shirke- Maharashtra State- India.

INTRODUCTION:

Use of R&D aspect as far as usage of Information Techniques (IT) including adoption of Modern Computerized Control in operation and maintenance of irrigation systems is one of the important ways, to improve the efficiency. The concept of individual Project Planning in isolation is getting outdated and a holistic approach for the entire River Basin is the need of the time. It is however very significant to note that ultimately it is the use of modern IT and computerization in flood control and Water Resource management is the solution and it will lead to the best performance of the River Basin Organization .

The computerization / automation can not be adopted with certain thumb rules. This is very dynamic process and adoption of modern Technique is a must. The R&D aspect helps in reducing cost of management and adopting more and more advance but economical methods/software. The basic points which need continuous R&D monitoring in Irrigation projects are :

- 1) Computerised Canal –automation
- 2) Computerisation of Flood Control

The present Paper deals with the aspect Number one viz. Computerized Canal –Automation

Computerized Canal Automation :

The need of the time is the distribution of water quantitatively as per schedule. This is easier said than done in reality under the present circumstances. Ofcourse the situation is slowly improving. In case of irrigation the schedule is required to be prepared crop/rotation and season wise. The changing factors like GWT, Climatic Conditions ,wind velocities play important role in water demand and application .



Figure1. Mechanized Laser Beam Field leveling

The Irrigation Manager will not be in a position to do this manually- effectively and efficiently. The present day over all efficiency can only be improved with Canal automation. **Unless we improve the Water Usage efficiency drastically in near future, we will be facing chronic water shortage**

Limitations of adopting Canal Automation practices in Developed Countries to ion in Developing Countries like India with much different Geographical, Climatic and Social conditions.

It will be desirable to know what has been done in this regard in the recent past in Maharashtra State of India..

Canal Automation in Khadakwasla Project :This was a sort of Pilot Project . It is a Major Irrigation Project in the Western part of the State of Maharashtra .The computerized monitoring and decision making system called Canal Irrigation Management System (CIMS) had been partially developed and installed on this project .There are some field difficulties and as such remote monitoring has not been fully achieved as yet.

The Pilot Project of Dynamic Regulation (PPDR) on Majalgaon Irrigation project .:This project had been undertaken with a World Bank Assistance and expertise available from GERSAR-France. Under this project ,main canal was to operate using controlled volume concept. To implement Dynamic Regulation, the cross regulators and head regulator have been motorized. A voice and data radio network has been established to communicate the



Figure2. Automated water sprinkler application. Guidelines from Developed Countries.

data to General Control Center This is established at Divisional Head Quarter, housing overall control and supervisory computer equipment's. The trial results were found satisfactory and are found useful as guideline for other projects the total cost can also be reduced effectively introducing the element of performance accountability.

It is noted that the project efficiency will increase by about 6 % due to dynamic regulations

during the operation effective maintenance to reduce seepage and strict control on the uses of water are very necessary's the canal always remain full during the season. In above cases its only the R&D will lead to ultimate positive results.

R&D in Computerisation of Canal Automation:

The basic concept is to calculate the water requirement for irrigation by climatic conditions prevailing and ground conditions so also other demands on the Project Water Resource and control the Heads Regulator/ Distributory Regulator I by wireless system and Computerised control. This concept is not new to Maharashtra (India). This is already in operation in couple Irrigation Projects . Obiviously as this is a very sensative and serious issue socially at grass root level , the perfection is the keyword.

Measurement , Compilation, Analysis of rainfall data ,Soil Moisture data,Sunshine Hours, Climatic data,Lake evcoporation data and communication to Copmputer Control Room.

The Author has got about thirty seven years actual field experience in Irrigation Water Resource in all its aspects of Planning ,Designning ,Construction , Water Management including the Higher Level Irrigation Management longterm Course at Colorado State University ,Fort Collins, USA under USAID . This background lead to the Post of Director General , Water and Land Management Institute , Aurangabad- widely known World over to those in the field of Water Resource. WALMI is playing very effective role jointly with full cooperation of the River Basin Organizations, NGOs ,Water User`Cooperative Socities and the farmers including the Women farmers ! This point was appreciated by one of the World bank team when the Team visited the Two weeks field training organized by WALMI ,in Western Coast of India (Konkan Region) which was largely attended by Women farmers. As the accuracy in Canal Automation is very important with time constraint, the R&D in this field playas prominent role. The review of this activity is taken from time to time at all levels eg. District level ,State level and National level Seminars and Brain Storming Sessions. In India the National Water Academy, Pune -the Nodal National Level Organization- is regularly taking review and finalizing the Recommendations which are suitable to respective zones in India separated Climatically.

The River Basin Organizations are effectively functioning for last about nine years with ofcourse some teething troubles ,those can be sorted out by the infrastructure mentioned above. As a matter of fact the Author's comparatively recent Papers selected for Oral presentation at SAWAF-III,Dhaka (July-2004) and International River Symposium- Brisbane ,Austrarlia (Sept.2004) dealt this aspect in detail.

The Results of the Case / Field studies:

The results of the above case studies point out the fact that all the Modern Techniques, Computerised Automation , adopted by some of the Developed Countries or Recommended by the outsider consultants can not be put to use directly by the Developing Countries as the Geographical and Climatic and local social conditions may totally differ. The following are the possible reasons / Feedback.

A) The experts may not be generally aware fully and have long experience about the Socio-Economic aspects prevailing in the Projected area./ District /State / Country.

It is also not unusual to find experts offering specific solutions as a general generic solution to all the similar problems anywhere in the World. This, which can be termed as "a solution-in search-of-a-problem " approach is not necessarily cost effective and may lead to failure . This point has widely been accepted by water managers / Experts.

Possible inadequate socio-economic support for capacity Building for water management. According to UNDP symposium (Delf 1991) capacity building includes a) Creating an enabling environment with appropriate Policy and Legal frameworks, b) Institutional development including Community Participation,and c) Human Resources Development and strengthening of Managerial systems.

Steps recommended for effective application of Canal Automation :

Appropriateness of technology plays a vital role in the ultimate success of any scheme. This encompasses wide range of parameters such as suitability of local conditions, acceptability by beneficiaries, economic viability and so on, Following suggestions address these parameters to inculcate appropriateness while introducing commercial viable IT technology in irrigation projects.

1) Instead of adopting “Patch work” solutions, more emphasis be given on institutional reforms i.e. changes in service definition ,changes in water allocation/delivery operation policy, changes in legal framework, introducing better monitoring and evaluation system introducing the element of performance accountability.

Any problem which demands IT based solution should be referred to the organizations or individuals located in the Country to find out if they can provide a viable solution. In case the in country expertise expresses its inability or if there is a known technology available outside the Country, then engaging an expatriate consultant from outside the country can be thought of. The selection of consultant should be based on positive contribution of the individual or organization in the concerned area.



Figure3. Canal Automation , Cross Regulators ,Majalgaon Irrigation Project ,India.

Local authorities should not act as implementing agencies only but should be involved fully in developing the solution with the external agency with an intention that complete transfer of technology occurs in the progress. Dissemination of the acquired know-how to as many professionals as possible and replicating it on other projects should be attempted.

2) Solution of a particular problem tried successfully elsewhere in the Country can be adopted by making appropriate modifications to suit the field conditions.

3). Capacity of the project implementing personnel in terms of technical knowledge, organizational and procedural constraints, limitations of funds and self sustainability of the technology /project over a long time span should be considered while developing and introducing modern techniques. In case an higher intellectual input is called for to acquire proficiency in the technique or involves arduous duties, the implementing personnel may be suitably rewarded to maintain the motivation.

As far as possible ,low cost technology using indigenous materials may be opted.

Finally the acceptance of the beneficiaries to any modern techniques plays a vital role, as without their co-operation the success will remain elusive. Hence continuous dialogue with the beneficiaries needs to be maintained during implementation and suitable mid-course corrections effected to make the technology popular.

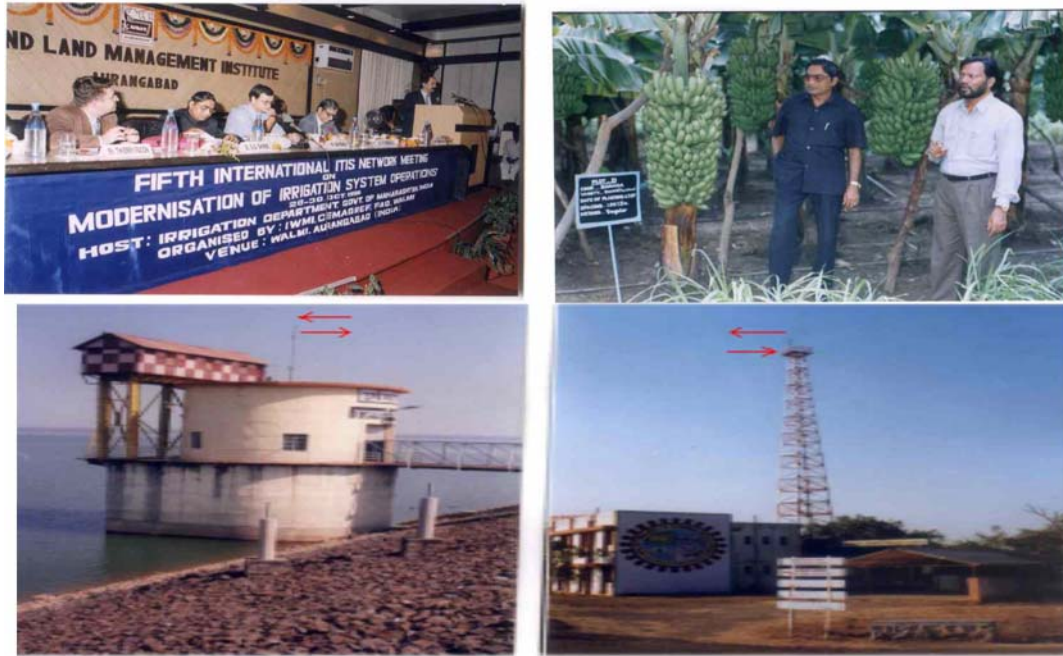


Figure4: IT IS-5,(WALMI),Tissue Culture and canal Automation Practices in India.

Conclusion in Brief:

The Computerized Canal Automation in Water Sector is the need of the day. This is a Dynamic and Continuous process. The procedure and workable solution may differ from Projects to Project and from Country to Country. Modern Techniques are effective tools to enhance efficiency provided they are applied with appropriateness to suite the ground realities, Socio –Economic conditions and to some extent psychology of the Beneficiaries./ Stake holders.