

Seminar on
Reforms in Management of Public Irrigation System
30-31 October, 2014, Bangalore



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1. Preamble

In due cognizance of the criticality of irrigated agriculture in ensuring adequate production which results both in food security and economic growth in contemporary India a Seminar to focus on the 'Reforms in Management of Public Irrigation System' was conducted on 30-31 October 2014 in Bangalore.

In India, more than 60% of the additional food will have to come undoubtedly from irrigated agriculture. The challenges for increasing the productivity of irrigation systems to meet the additional demands of food for an increasing population in the face of increasing scarcity and competition for water has forced countries to think of new strategies.

With limitation on natural resources such as land and water and the delay suffered in the implementation of major and medium irrigation projects, largely due to problems of land acquisition and resistance due to insufficient consultations with the beneficiaries and affected population, horizontal expansion of irrigated agriculture is becoming more challenging than before. The most severe problems facing Indian irrigation systems are the increasing costs of new schemes, the huge backlog of incomplete schemes.

2. Background

Despite an impressive growth in irrigated agriculture, there has been a growing recognition that the benefits are not always commensurate with the investments. The performance of irrigation systems is of serious concern to farmers who rely on them for their crops and livelihoods and to governments that have invested heavily in their development. Large-scale canal irrigation systems, in particular, are in poor condition: they are not properly maintained, operations are inadequate, water supplies do not reach the end of systems, and the timing of water supply is unreliable. The wide gap between actual and desirable performance threatens the sustainability of irrigated agriculture.

With limited scope in the horizontal growth of the irrigation sector, vertical growth of the sector holds greater potential for meeting demand for additional food production. The need therefore is for diagnosis of existing irrigation services and modernization options. Structural changes and appropriate reforms are necessary to improve the services provided, performance of the systems and long-term sustainability of irrigation systems.

It has almost been two decades since structural adjustment and sector reform processes are being implemented in India. Under these sectoral reforms, legal, institutional, financial and regulatory changes are also ongoing in the water sector through water sector loans/grants provided by the International Financial Institutions. At the same time given the need to contribute to the cleaner energy to fuel the development engine and provide food and adequate nutrition to the growing population in the country and their intricate linkages, the irrigation reforms have to follow the IWRM process and take the Water-Food-Energy nexus into consideration.

With a view to review the progress in the reforms process in irrigation sector, Central Board for Irrigation and Power organized the seminar to look critically largely covering the following themes organized as individual sessions:

- Reforms in Irrigation Systems
- Operation & Maintenance of Irrigation System
- Participatory Irrigation Management
- Modernisation of Irrigation Systems

Several dedicated sessions put a significant thrust in advancing micro irrigation technologies in which several private players also participated also helped some recommendations of interest to private sector players which could give an impetus to the objectives of water savings and increased agricultural productivity.

3. The Outcomes

The outcomes of these individual sessions including the significant plenary session, in the form of observations and recommendations are provided in a nutshell as below:

Reforms in Irrigation Systems

- Policies, strategies, and interventions for reforming public irrigation systems should be coherent with not only the National Water Policy but also other related national development policies such as energy, environment and agriculture policies.
- There is need to identify the challenges in introducing these reforms within the overall framework of IWRM and address the need to restructure traditional departments that deal with water. Many organizations both at the Centre and states may need to be revamped.
- One of the main problems in implementation of IWRM principles has been due to inter-state division of river basins. This needs to be resolved by encouraging different states within a basin to cooperate.
- Adopt integrated approach in planning and implementation of Watershed Development and Management programs by including water harvesting and collection; and farm level water storage structures for irrigation in rain-fed agriculture. Micro level watershed development program like Minor tanks for community should be planned at village levels.
- In view of its heterogeneity in agro-climatic features (in soil, climate, crops, land forms, etc.,) and other social and cultural practices unique to the North Eastern India, policy for agricultural growth for enhancing productivity of land and water resources, need to be framed keeping the specifics of the region in view.
- There is a need for renewed emphasis on promoting more vigorously conjunctive use of surface and groundwater to achieve greater water use efficiency. However, such a conjunctive use should be promoted by design and not by default.
- One has to take on board issues like water logging, and also factor the concept of multi-use of water for fisheries besides agriculture and eco system deliverables in planning of irrigation schemes within available *scopes and constraints based on socio-economic and other impacting factors*.
- Keeping the water- energy- food nexus in mind, it is necessary to adopt a combined index that reflects jointly water required per unit of food grain production (m^3/MT) and energy required per unit of food grain production (kW/MT).

- There is a need for substantial reforms in the way water and electricity bureaucracies currently work. On electricity subsidy for irrigation to the farmers, it was suggested that endowment subsidy to farmers (in terms of electricity quantity) with electricity charged at market price is better than the current system of subsidized or free electricity.
- There is a need for reforms in the pricing of irrigation water with endowment of water to farmers be fixed and allowing the farmers to trade water.
- PPP in irrigation management could be through consortia of agro-industry (sugar, oil, grain processing etc.) which could *inter-alia*, comprise of irrigation equipment manufacturers and suppliers, and PSUs of the State or Centre, as the case may be, for mobilizing funds.
- Despite recent developments in ICT (Information and Communication Technologies), their use in irrigation sector has however been much slower than desirable and much slower than that in the energy sector. There is need for laying emphasis on recognizing the crucial role the technologies can play and facilitating their use in improving management of water.
- It is necessary to popularize the digital data processing (acquisition, transferring, archiving and retrieval) and use of recently developed cloud computing technology makes the servers accessible even to remote areas. Hence modernization of irrigation systems shall include a strong component of ICT based data processing systems.
- Use of Remote Sensing technologies (WRIS of NRSA) and GIS for planning and monitoring the performance of irrigation systems with near real time inputs are to be well to-be integrated with irrigation management and the research needs in scaling them up or down, as per different contexts that one obtains in Indian situation.
- Judicious use of water through recycling and reuse of water, appropriate crop planning & rotation and use of water saving technologies has to be part of any built in to the management of irrigation systems.

Participatory Irrigation Management

- The general experience with PIM introduced in various states has generally been 'mixed' with isolated pockets of success. More needs to be done in this regard.
- Participatory Irrigation Management, rationalization of water charges, and incentivizing efficient use of water shall help in attaining the water use efficiency targets at all levels as targeted in National Water Mission.
- Karnataka Government brought out an excellent opportunity that could be possible in reforms in public irrigation systems that extend even beyond the limited scope of irrigation to include processing etc of farm products and encouraging bio energy.
- In order to have participatory governance together with the stakeholders, and address water security issues for farming sector, appropriate legal and institutional frame work, empowerment of WUAs and other stake holders have to be addressed.

Modernization of Irrigation Systems

- With the swift changes in demands for water and developments in irrigation and agricultural practices, it is necessary to address issues related to timely, adequate and equitable water delivery, and efficient management of irrigation systems.
- Agriculture is a major consumer of water (more than 80%), so more emphasis should be given to improving efficiency of Irrigation water management since this would help water saving and judicious use of water.
- In view of increasing competition for water from various sectors, and increasing need to produce more food, it is necessary to improve water use efficiency, financial efficiency, and adopt the best management practices in irrigation.
- FAO's Mapping Systems and Services for Canal Operation Techniques (MASSCOTE), a new assessment tool to improve WUE and productivity in canal command areas, is recommended for adoption on a wider scale.
- Modernization of irrigation system should include adoption of piped network and micro irrigation systems of should be made mandatory in new irrigation projects and encouraged in canal command areas as well as community based Minor Irrigation Tanks in order to achieve better efficiencies & economy

- Modernization of existing canal command areas through adoption of piped network & Micro Irrigation Systems would lead to an expected increase in overall water use efficiency to more than 80 %. Piped networks also help in reducing chances of water leakages, theft and damages like overtopping of bunds in canals.
- The use of computers, communication and information to control irrigation systems will yield many benefits, resulting in obvious economic savings and in intangible benefits whose value cannot be measured in monetary terms.
- Adoption of piped network in irrigation projects/canal command areas enables saving the losses due to conveyance in main and branch, canals, besides controlling evaporation losses, seepage, deep percolation etc. It also helps keep land acquisition costs and associated difficulties low.
- Although promoting solar power for use in agricultural sector is very relevant and important, however providing huge subsidies for its promotion is not the right way to go ahead. The example of Karnataka where surplus solar power generated by farmers will be sold to the electricity department provided an insight on new prospects of innovative solutions that can help energy shortage.

Operation & Maintenance of Irrigation System

- Performance benchmarking is necessary to identify and adopt :
 - a. best service delivery practice (adequacy and efficiency of irrigation deliveries),
 - b. high production efficiency in terms of productivity per unit of irrigation water delivered, and
 - c. avoid adverse environmental impacts.
- Benchmarking has to be a major tool for assessing the performance of all types of public irrigation systems and the State Govts. must undertake this activity on a priority basis. has Experiences from Maharashtra, which has already embarked on this activity, can be of tremendous use for other States.
- Comprehensive water audit is an effective tool for realistic understanding and assessment of the present performance level and efficiency of the service and the adaptability of the system for future expansion & rectification of faults during modernization and an important tool that helps correct diagnosis of the causes for poor performance of irrigation systems and to facilitate identifying optimum solutions. Hence, water audit shall be undertaken for all irrigation systems that need improvement in performance.
- Appropriate water pricing should be evolved to meet location specific issues such that at least O&M costs are recovered.

Micro-irrigation

- Micro Irrigation Systems (Drip and Sprinkler irrigation) play a major role in water saving. These new technologies used in conjunction with radio controlled automated technology should be adopted for not only saving water but also helping saving energy, increase yields of crops, reduce input costs and yield more inherent advantages.
- Micro irrigation schemes should be accepted as extension of irrigation projects to the farm level, compulsorily used as part of all lift irrigation schemes and as far as possible in canal command areas, in order to improve water use efficiency of irrigation systems and water productivity.
- Micro Irrigation systems could be promoted for food grains - rice and wheat, coarse cereals, pulses, oilseeds and fodder crops apart from fruits and vegetables. The successful examples from Karnataka and Tamil Nadu indicates the opportunity for extending micro irrigation technologies on a large scale in to existing irrigated and cropped areas with surface irrigation for sugarcane.
- Because of the multi fold advantages, micro irrigation should be given the status of "Infrastructure Industry" and be declared as "Priority Sector". Fiscal benefits (Income tax, financial assistance etc.) available to irrigation projects should be extended to micro irrigation system manufacturers

- Hybrid energy systems comprising solar, diesel, and electricity shall be developed and adopted to ensure uninterrupted & efficient power supply for pressurized irrigation systems. Wherever feasible, gravity shall be used to power drip irrigation systems.

Cross-cutting

- In view of the role of various disciplines in enhancing agricultural production, the multi-disciplinary approach involving a team of experts of the associated disciplines like agriculture, social welfare, cooperative affairs and economics and statistics, commensurate with the needs of the individual departments, is necessary to facilitate appropriate irrigation reforms.
- In view of the lack of trained personal with multidisciplinary background, capacity development enabling the existing personnel through conducting specialized courses in water management and administration and training needs to be undertaken.
- It is necessary to intensify the efforts of educational and research institutions in developing multidisciplinary programs and conducting training programmes aimed at exposing the existing staff to the multidisciplinary aspects of irrigation management. All states should benefit from the Advanced Centre for Research on IWRM being set up in Karnataka with assistance of Asian Development Bank (ADB).
- The Corporates could be enabled with investing funds through their CSR activities for creating awareness and capacity development at all levels in a holistic manner.

4. Concluding Thoughts

The management of irrigation systems has gained importance over the last five decades due to tremendous increase in irrigated area in the country, primarily as a result of massive investments in new and existing surface irrigation projects. There has been a growing realization of an imperative need for improvement in water management for a more efficient use of available water resources. The potential of information technology applications for improved irrigation system management was realized long ago, but concerted efforts on this front have only been made in the last ten years.

The irrigation reforms in various states have been implemented with various degrees of success. The evaluation of the reforms has at best been isolated with little exchange of experiences across state boundaries. There is no formal or informal platform at the national level to share these experiences. The Seminar organized by CBIP was the first such seminar organized on the subject which provided an opportunity to look at the stage at which the reforms process finds itself. However, the geographic reach of the seminar remained mainly limited to southern states. From that perspective the exercise has had a limited success. But it was an excellent beginning. There is need for a similar follow up on irrigation reforms in Northern and Eastern states.

As irrigation sector reforms undergo a continuous change, such a follow up has to be undertaken at regular time intervals.
