

NEWS LETTER (WATER RESOURCES SECTION)

Seminar on REFORMS IN MANAGEMENT OF PUBLIC IRRIGATION SYSTEM

30-31 OCTOBER, 2014, BANGALORE



(L-R) Mr. B.G. Gurupadaswamy, Secretary, WRD, Govt. of Karnataka, Mr. P.B. Ramamurthy, Addl. Chief Secretary, WRD, Govt. of Karnataka, Mr. M.B. Patil, Hon'ble Minister for Water Resources (Major & Medium Irrigation), Govt. of Karnataka, Mr. A.B. Pandya, Chairman, CWC and Mr. V.K. Kanjlia, Secretary, CBIP

INTEGRATED WATER RESOURCES MANAGEMENT (IWRM) is a process which promotes the coordinated development and management of water, land and related resources in order to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. It has been accepted as the means to achieve the overall sustainable development and benefit of the society. However, putting the process in place has been found to be complicated and little progress has been achieved so far not only in India but also around the world. The growing water scarcity due to global changes including climate change, calls for efficient use of water resources.

Water - Energy - Food nexus poses additional complexities due to lack of full understanding of the linkages between the three seemingly different sectors. An integrated approach from individuals, stakeholders and the government between water energy and food to solve the issues associated to any of these sectors with least stress on ecosystems is the need of the hour. It has almost been two decade since structural adjustment and sector reform processes are being implemented in our country to achieve the vision of National Water Policy. 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 water sector interventions have to follow the IWRM process and keep the Water-Food-Energy nexus into consideration.

Under these sectoral reforms, legal, institutional, financial and regulatory changes are also ongoing in the water sector. The focus of such reforms is on financial sustainability and technical solutions to the existing problems in the water sector.

Under these reforms, many states in India have now passed the Participatory Irrigation Management (PIM) Act and have initiated the process to form Water Regulatory Authorities. Since, many State Govt. have been considering forming the water regulatory authorities for some time now, it is an opportune moment to intensify the debate about the kind of regulation that is needed in the water sector, and ask what the larger framework of reforms within which it would be placed should be.

Keeping in view the above, a national level seminar on the topic “Reforms in Management of Public Irrigation System” was organized by Central Board of Irrigation and Power, Central Water Commission in association with Water Resources Department, Govt. of Karnataka, and its subsidiaries Karnataka Neeravari Nigam Limited (KNNL), Krishna Bhagya Jal Nigam Limited (KBjNL), Cauvery Neeravari Nigam Limited (CNNL); and sponsored by International Commission on Irrigation and Drainage (ICID); Food and Agriculture Organization of the United Nations (FAO); International Water Management Institute (IWMI), Maharashtra Water Regulatory Authority, New Delhi Associate Centre of World Water Council (NDC-WWC); Indian Geographical Committee of the International Water Resources Association. The seminar is sponsored by the Jain Irrigation Systems Ltd., Netafim Irrigation India Pvt. Ltd., GOMACO Corporation, USA and Mechatronics Systems Pvt. Ltd.

This seminar was organized with a view to encourage engineers, economists, professionals, and administrators involved in the water and agriculture sector to share their experiences and enhance their knowledge by way of participation in session on the various topics of the seminar. This would help to spread awareness of the inter-sectoral linkages of water, food and energy give impetus to reforms in the irrigation sector.

PLENARY SESSION

The Plenary Session was chaired by Shri A.B. Pandya, Chairman, Central Water Commission and co-chaired by Shri Kapil Mohan, Managing Director, Krishna Bhagya Jal Nigam Limited. The following presentations were made by the national and international professionals during the Plenary Session are:

- Reforms in Management of Public Irrigation System – *Mr. Avinash C. Tyagi, Secretary General, International Commission on Irrigation and Drainage*
- Water, Energy and Food Nexus ; An Integrated Approach for Sustainable Development – *Dr. Tushar Shah, Senior Fellow, International Water Management Institute*
- From Poverty to Prosperity through Reforms in Agriculture Development in South Korea – *Mr. Bong Hun Lee, Vice President, ICID, Korea*
- IWRM – in 21st Century: Challenges and Options – *Dr. P.B.S. Sarma, Former Project Director, Water Technology Centre, Indian Agriculture Research Institute.*



Shri A.B. Pandya and Shri Kapil Mohan

TECHNICAL SESSION I

Reforms in Indian Irrigation system was chaired by Mr. M. Gopalakrishnan, Hon. Secretary General, ICID and co-chaired by Ms. Malini Shankar, Principal Secretary, Water Resources Department, Govt. of Maharashtra. The following presentations were made by the professionals.

- Irrigation management governance for sustainable irrigation and water re-use – *Mr. A.B. Pandya, Chairman, Central Water Commission*
- Regulating water resources for efficient, equitable and sustainable use in Maharashtra – *Mr. Ravi Budhiraja, Chairman, Maharashtra Water Regulatory Authority*
- Institutional Reforms in Indian Irrigation Sector: Approach and Strategies for Implementation – *Prof. Dr. R. Maria Saleth, Director, Loyola Institute of Business Administration (LIBA)*
- Issues in water rights, institutional design and pricing that need resolution in the context of private capital and management in water - *Prof. Sebastian Morris, Indian Institute of Management Ahmedabad*
- Policy initiatives for reforms in irrigation management – *Dr. Mukesh Sinha, Sr. Joint Commissioner, Ministry of Water Resources*
- Breaking the Agrarian Impasse in Eastern India: Understanding the Land-Water-Energy-Food Nexus – *Mr. M. Dinesh Kumar, Executive Director, Institute for Resource Analysis and Policy*



Mr. M. Gopalakrishnan and Ms. Malini Shankar

TECHNICAL SESSION II

Participatory Irrigation Management, was chaired by Mr. Avinash C. Tyagi, Secretary General, International Commission on Irrigation and Drainage and Co-chaired by Dr. R.P.S. Malik, Principal Researcher Economics, International Water Management Institute. The following presentations were made by the professionals:

- Experiences of benchmarking in irrigation projects - Ms. Malini Shankar, Principal Secretary, Water Resources Department, Govt. of Karnataka
- Conjunctive management of surface and ground water – Dr. Tushar Shah, Senior Fellow, International Water Management Institute
- Participatory Irrigation Management for improved efficiency – Andhra Pradesh experiences – Mr. G. Surender, Water and Land Management Training and Research Institute (WALAMTARI), Hyderabad
- Two decades of participatory irrigation management in Maharashtra - Dr. Suresh A. Kulkarni, Secretary, Maharashtra Water Resources Regulatory Authority
- Experiences, Challenges and Way Forward for promoting PIM – Mr. Sachin Ozha, Executive Director, Development Support Centre
- Integrated Water Resources Management with special emphasis on Participatory Irrigation Management – Mr. M.G. Shivakumar Superintending Engineer, Karnataka Neeravari Nigam Limited
- International experience on river basin approach for advocating irrigation management reforms in India – Prof. S.C. Patra, Director and Chief Engineer, NERIWALM, Tezpur



Mr. Avinash C. Tyagi and Dr. R.P.S. Malik

TECHNICAL SESSION III

Modernization of Irrigation System, was chaired by Dr. Tushar Shah, Senior Fellow, International water Management Institute and Co-chaired by Dr. K. Yella Reddy, Director, WALAMTARI, Hyderabad. The following presentations were made by the professionals:

- Progressive technologies in irrigated agriculture – Er. M. Gopalakrishnan, Hon. Secretary General, ICID
- Use of geospatial technology for irrigation management – Dr. Abdul K. Hakeem, Senior Scientist, SG, National Remote Sensing Centre
- Integrated Irrigation Solutions- Case Studies In India – Mr. Somnath Jadhav, Vice President, Jain Irrigation Systems Limited
- Limits to improving water use efficiency for waters saving in Indian river basin – Dr. Upali A. Amarasinghe, Senior Researcher, International Water Management Institute
- Adoption of Drip irrigation technology in larger scale irrigation projects in canal command areas – Issues, approaches and efforts for Ramthal Drip Irrigation Project - M.S. Ramesh, Director, NETA FIM
- Reforms in Irrigation Management: Modernization of Irrigation Management – Building Blocks in Karnataka State, India – Mr. P. Somasekhar Rao, National Water Resources Planning Specialist, Asian Development Bank



Dr. Tushar Shah and Dr. K. Yella Reddy

TECHNICAL SESSION IV

Operation & Maintenance of Irrigation System, was chaired by Dr. P.B.S. Sarma, Former Project Director, Water Technology Centre, Indian Agriculture Research Institute and Co-chaired by Shri P.K. Chatterjee, ED, CES Jacob Ltd. The following presentations were made by the professionals:

- Micro – Irrigation for sugarcane in Karnataka – An unique initiative - Prof. Aravind Galgali, Director, KBJNL.
- Improve cost recovery in irrigation – Dr. R.P.S. Malik, Principal Researcher Economics

- Public private partnership in irrigation projects – *Ms. Sushma Nirmal, Senior Vice President, Infrastructure Development Corporation (Karnataka) Limited*
- Improving the water and energy efficiency for food production through drip irrigation – *Dr. Santosh K. Deshmukh, Chief Co-ordinator, Jain Irrigation Systems Limited*
- Introduction of micro-irrigation in new irrigation projects of Karnataka State for enhancing water use efficiency – *Mr. M.G. Shivakumar, Superintending Engineer, KNNL*
- Canal automation to improve the water use efficiency – *Mr. Sidharth Charkha, Vice President, Marketing & Business Development, Mechatronics Systems Pvt. Limited*

TECHNICAL SESSION V

Water, Energy Food Nexus, was chaired by Mr. M. Gopalakrishnan, Hon. Secretary General, ICID and Co-chaired by Mr. R.K. Sinha, Director & Chief Engineer, NERIWALM, Tezpur. The following presentations were made by the professionals:

- Water, energy and food nexus – Sustained food security implications – *Dr. Thierry Facon, Asian Development Bank*
- Progression of Micro Irrigation into Canal Commands APMIP Experience – *Dr. K. Yella Reddy, Director, WALAMTARI, Hyderabad*
- Scope of Public-Private Partnership for Sustainable Development of Water Resource Projects in a Backward Region of India - *Dr Binayak Rath, Former Vice Chancellor, Utkal University*
- Yettinahole Integrated Drinking Water Project-Issues and challenges in harnessing west flowing rivers in Karnataka State - *Mr. R. Cheluvvaraju and M Satish, Chief Engineer, KNNL*
- Slipform Pavers for faster Canal lining - *Mr. Ashutosh Dhar, Director, Worldcon Technologies Pvt. Limited.*

TECHNICAL SESSION VI

Other issues was chaired by Prof. Binayak Rath, Former Vice Chancellor, Utkal University and Co-chaired by Mr. Thierry Facon, Asian Development Bank.

- Pricing of Irrigation Water in Maharashtra - *Mr. S.A. Kulkari, Secretary, Maharashtra Water Resources Regulatory Authority*
- Modernizing a public irrigation scheme - A case study of Pakistan's Hakra canal scheme – *Mr. Arif Anwar, Muhammad Azeem Ali Shah, Muhammad Aslam*
- Canal automation – to raise water use efficiency – *Mr. Mukesh Arora Senior Research Officer, Central Water & Power Research Station*
- Systems approach to management of tanks – *Mr. Upendra D. Kulkarni Associate Professor, Shri Guru Gobind Singhji Institute of Engineering and Technology*

The seminar attended by 200 participants from all parts of India was inaugurated by **Mr. M.B. Patil, Hon'ble Minister for Water Resources (Major and Medium), Govt. of Karnataka** on 30th October 2014. While highlighting that this national seminar would enable them to share, learn and strategize their approach for furthering the reforms in irrigation sector to utilize available water in an efficient way, he stated that water resources were the critical inputs for the growth



Dr. P.B.S. Sarma and Shri P.K. Chatterjee



Mr. M. Gopalakrishnan and Mr. R.K. Sinha



Prof. Binayak Rath and Mr. Thierry Facon

of economy in general and any sector in particular. Among the users of water, Irrigation sector consumes the highest share of available water resources and is critical to food security and economic growth in contemporary India and in many other countries. Although every state government and Government of India had given high priority to irrigation investments and invested heavily in public irrigation systems, 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. The most severe challenges facing Indian irrigation systems are the increasing costs of new schemes, the huge backlog of incomplete schemes, and the increasing problems in existing systems. Large-scale canal irrigation systems, in particular, are posing bigger challenges for proper maintenance, adequate operations, ensuring water supplies to reach the end of the systems, ensuring sustainability of irrigated agriculture etc. To address the various challenges reforms in irrigation sector are inevitable and many states in India including Karnataka have embarked on the reforms path with partnerships from international agencies. As part of the reforms, Karnataka state had given high priority to modernization of the irrigation systems to improve the performance of the systems and enable savings in allocated water resources. Karnataka state also amended the Irrigation Act of 1965 to enable Participatory Irrigation Management (PIM) and partner with the farmers in the form of Water Users Cooperative Societies for better management of the irrigation systems. He mentioned that the Government of Karnataka has undertaken several initiatives in water sector reform.

He also informed that the Government of Karnataka has established the Advanced Centre for IWRM (AC-IWRM) in February 2012. An IWRM framework provides the opportunity to integrate the land and water related aspects at the sub-basin or river basin level.

Vast irrigation potential was created in this country. However, this potential is not converted into utilization due to various challenges. Giving emphasis for narrowing the gap between potential created and utilized, Government of Karnataka ensured the last mile of the irrigation net work covering upto sub-distributories and minors were taken up on a large scale.

Water Auditing is the most important factor in water management. The time gap between excess flows in canals and control over these flows is very high. Therefore, to achieve concurrent water audit, real time measurement and flow of water, telemetry with electronic flow meters was piloted successfully in the Ghataprabha irrigation system (GLBC) Karnataka and we could achieve substantial savings and will ensure better management of water. Now this telemetry is being implemented in Narayanapur irrigation system on a large scale including the SCADA and 6 to 8 projects will be taken up in coming years under ADB and other programs.

An irrigation project which is entirely piped irrigation system is developed to irrigate, 26,000 acres of land in drought prone areas of Haveri district for efficient water usage and management. Operation of this project will be under SCADA, nearly 40% of the area to be irrigated is enhanced. The entire system works at 90% efficiency. Inspired by this success, a note worthy initiative taken up by the State in promoting sprinkler and drip irrigation in a number of its projects. More than 6.5 lakh hectares will be covered by drip irrigation in the State thereby bringing in big savings of precious water apart from preventing soil salinity etc. due to flood irrigation. Sugarcane is being considered as a crop under drip. All efforts are being made to cover an area of about 6.39 lakh hectares which will save significant quantum of water.

Shri A.B. Pandya, Chairman, Central Water Commission addressed the august gathering during the inaugural session. During his address he briefly touched the issues of reforms in management of public irrigation system. He also showed his concern on the gap in potential created and utilised. He mentioned that planning and construction of major, medium and minor projects, there is a delay due to the various reasons such as inadequate survey & investigations; long process of project clearance, particularly environment & forest clearance; issues related to Rehabilitation & Resettlement (R&R) of project affected people (PAP); long gestation period due to poor management / lack of funds during construction etc. While discussing about the irrigation management governance, he mentioned that focus should be on full utilization of created facilities, improving water use efficiency, completing as many ongoing projects as possible for which the ongoing projects should be prioritized. He mentioned that there is a need to have an aggressive MMI management reform agenda and action plan such as Gradual transfer of management of irrigation systems to WUAs; Appropriate pricing, Pricing on volumetric basis, Use of modern technologies etc. and Private sector participation in planning, construction and management in judicious manner

The top most priority are to be given for works related to Command Area Development and Water Management (CAD&WM), and Extension, Renovation and Modernization (ERM) of old major and medium irrigation projects and Maintenance of created infrastructure. He mentioned that the reform measures should inter-alia include rationalization of water charges; establishment of regulatory mechanism; comprehensive training of project management personnel; and adoption of modern management tools etc.

Central assistance should be subject to condition that better management practices would be adopted by the State Governments. The better management practices should, inter-alia, include establishment of minimum Irrigation Service

Fee (ISF) at a reasonable level as proposed in 12th Plan; promotion of Participatory Irrigation Management through WUAs at outlet and distributary level; maximization of the collection of ISF from users through WUAs, among other things, by allowing WUAs to retain at least 50 percent of ISF collected for maintenance of the distribution system; undertaking, in a campaign mode, a program to close the gap between IPC and IPU through farmer-participatory CAD works; enhancing the resources available to the MMI departments for improving O&M of irrigation systems through technological improvements such as automation and use of information technology etc.; broadening the disciplinary skill-set available with irrigation departments to include social science and agriculture extension skills; and substantially improving the amount and quality of training and capacity building opportunities for MMI staff at all levels.

A perspective plan for integrated development of water resources for diverse uses of water at the river basin as well as sub-basin levels indicating therein total availability of water on short-term, long term and medium term basis needs to be evolved. As demand in industries is going to increase, technological development in processing and methods of reusing water are expected to reduce the demand of fresh water. The wastes (effluents), if reused within the industry with/without treatment as permissible would help in minimising fresh water requirements while achieving reduction in wastewater volume for final treatment before discharge, deriving economy at both ends. Reclaimed waters from wastewater after treatment are generally used for “agricultural” irrigation, cooling water, algal cultivation and pisciculture, apart from other industrial uses.

Shri P.B. Ramamurthy, Addl. Chief Secretary, Water Resources Department, Govt. of Karnataka while addressing the august gathering mentioned that this two-day seminar on ‘Reforms in Management of Public Irrigation System’ is held with the objective of sharing the experiences by experts in the field of agriculture and irrigation on the need for reforms and how much has been achieved and what should be our future course of action and priorities. He believed that there was no two-opinion on the need for reforms in the irrigation sector. We needed to acknowledge that reforms in irrigation sector have not gathered expected momentum because of several reasons. Reforms are an ongoing phenomenon and we need to continue to evolve new initiatives in all aspects of irrigation management like improving the water use efficiency, institutional strengthening and capacity building of all the stake holders, irrigation managers and the farmers.

Karnataka Government has initiated many reforms in irrigation sector. One of the noteworthy among them is the amendment to irrigation act in 2002 defining the functions and conferring certain powers to the Water Users’ Association. Quantum of water delivered to the WUAs is to be measured and water tax levied. The WUAs are expected to operate the canals in their jurisdiction, collect water charges and maintain the system.

Another reform that Karnataka State is giving thrust to is in improving the Water Use Efficiency. In this regard, Karnataka Government has taken up modernization of many projects to improve the performance of irrigation projects.

Another initiative in improving Water Use Efficiency is in promoting sprinkler and drip irrigation in a number of its projects. Karnataka State is implementing ‘Karnataka Integrated and Sustainable Water Resources Management Investment Programme’ with ADB assistance in the Tungabhadra Sub-basin. It is a seven year programme of 225 Million dollars. The activities planned are modernization of three sub-systems (Gondhi, TLBC and Vijayanagara Channels), institutional strengthening (AC-IWRM), River basin planning, MIS implementation and capacity building by IWRM certification programme for WRD Engineers. This programme which is expected to bring in IWRM in to practice in Tungabhadra Sub-basin will be replicated in other sub-basins of the State.

There are many issues and challenges facing the irrigation management in Karnataka and in India. The seminar is expected to throw light on the challenges ahead in bringing in effective PIM, modernization of irrigation systems, IWRM practice and policy initiatives necessary to support the reforms and more importantly the implementation strategy. Sharing of experiences among the experts and delegates gathered here will go a long way in speeding up the reform process in the State and in the country. I look forward to the deliberations of the seminar and wish the seminar every success.

Shri B.G. Gurupadaswamy, Secretary, Water Resources Department, Govt. of Karnataka, Bangalore welcomed the dignitaries and the august gathering, of Policy makers, Administrators, Engineers, Academicians, Researchers, and Industry representatives assembled with one common objective – To share, discuss, debate, exchange ideas & thoughts which will culminate in giving a new direction in management of public irrigation system” not only in India but at a global level. He mentioned that time has come now to relook at our policies and strategies in the water sector in the light of impacts of global climate change, population increase, increased water needs for the different sectors like drinking water, industries requirement, navigation, commercial usages in fisheries, horticulture, recreation etc., Innovative way of managing water is crucial aspect, considering the finite source of water which is being stressed out due to mis management and misconceptions among the end users. It is in this context that the Seminar on “Reforms in Management of Public Irrigation System” scheduled for today and tomorrow has immense potential to deliver the most promising outcomes to carry forward the wide ranging reform initiatives in the Irrigation sector for efficient management of Public Irrigation System. He also welcome the Hon’ble Minister for Water Resources, Govt. of Karnataka, Sri. M.B.Patil, who is an Engineer by qualification, Philanthropic Educationist by Profession and an visionary politician & policy maker by Passion, who has

graciously consented to inaugurate this Seminar and deliver his inaugural address. He has been our guiding force to usher in pioneering reforms in the Public Irrigation System in our state with his innovative ideas and path breaking initiatives.

While welcoming Shri A.B. Pandya, Chairman, Central Water Commission & Ex-officio Secretary to Govt. of India who has conceptualized this seminar which is of great relevance both in India and at global level, for optimal management of our finite resource i.e., WATER. He also extended a warm welcome to Addl. Chief Secretary, Water Resources Department, Govt. of Karnataka Shri P.B. Ramamurthy, who within a short period of his assumption of charge of the department is spearheading the reforms agenda in the public Irrigation System in our state and is our pillar of support in all our endeavours in the department of Water Resources. With his guidance the department will certainly lead by example in setting up the model integrated water resource management in place.

During the inaugural session, Hon'ble Minister and Chief Guest for the function released the Proceedings of the seminar comprising the articles received from the professionals which certainly shall add new dimensions to the body of knowledge on the subject.

Finally **Shri V.K. Kanjlia, Secretary, Central Board of Irrigation and Power** proposed the vote of thanks to the dignitaries and the participants.

Some of the important points emerged during the two days deliberations of the seminar are :



Releasing the Proceedings of the Seminar

1. Policies, strategies, and interventions developed for reforming irrigation system management shall be coherent, effective, and feasible to ensure inclusiveness and equity among stake holders.
2. There is a need to restructure the departments, organizations at centre and state levels to achieve adoption of appropriate legal and institutional frame work, empowerment of WUAs and other stake holders, implementation of IWRM, PIM, rationalization of water charges, and incentivizing efficient use of water.
3. With recent developments in mobile communication technologies, adoption of ICT (Information and Communication Technologies) in irrigation management needs popularization for digital data processing (acquisition, transferring, archiving and retrieval). 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.
4. Use of RS (WRIS of NRSA) and GIS for planning and monitoring performance of irrigation systems with near real time inputs.
5. Micro irrigation systems in all lift irrigation schemes as well as in canal command areas, using radio controlled automated technology shall be adopted to improve WUE, and productivity of Irrigation systems.
6. FAO's Mapping Systems and Services for Canal Operation Techniques (MASSCOTE) shall be adopted in all canal command areas to improve WUE& Productivity.
7. 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).
8. Wherever it is feasible, gravity shall be used to power drip irrigation system.
9. Hybrid energy systems comprising solar, diesel, and electricity shall be developed and adopted to ensure uninterrupted & efficient power supply for pressurized irrigation systems.
10. As far as possible, recycling and reuse of water has to be built in to the management of irrigation systems.
11. Appropriate water pricing should be evolved to meet location specific issues such that at least O&M costs are recovered.
12. All states should benefit from the Advanced Centre for Research on IWRM being set up in Karnataka with assistance of ADB.
13. As far as possible PPP in irrigation management shall be through a consortia of agro-industry (sugar, oil, grain processing etc.) irrigation equipment manufacturers and suppliers, and PSUs for tapping funds through CSR.
14. In view of its heterogeneity in agro-climatic features (in soil, climate, land forms, etc.) of Eastern India, a policy for agricultural growth for enhancing productivity of land and water resources, need to be built on the concept of multi-use, subject to the scope and constraints on socio-economic point of view.