

Lecture notes
On
Introduction to Command area development (CAD)-programme
and components

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COMMAND AREA DEVELOPMENT PROGRAMME

During the post-independence era, a large number of irrigation projects were constructed for increasing the agricultural production in the country. However, during early seventies analysis of irrigation potential created and utilized revealed that there was a substantial gap between them. The Irrigation Commission made specific recommendations in its report in 1972 that systematic development of commands of irrigation projects should be taken up in order to fully utilize the irrigation potential created. Subsequently, a Committee of Ministers set up by the Ministry of Irrigation and Power analyzed the issue and suggested in 1973 that a broad based Area Development Authority should be set up for every major irrigation project to undertake the work of comprehensive area development. Based on this recommendation, the Government of India initiated a Centrally Sponsored Command Area Development Programme (CADP) in December 1974 to improve the irrigation potential utilization and optimize the agricultural production and productivity through integrated and coordinated approach of efficient water management.

In tune with the objectives of programme, a number of components such as construction of field channels and field drains, enforcement of warabandi, land leveling and shaping, realignment of field boundaries, consolidation of holdings, introduction of suitable cropping patterns, strengthening of extension services, etc. were included in the programme. Subsequently, in view of the emergent needs, a few more components like farmers' participation and reclamation of waterlogged areas were also included in the programme on 1st April, 1996 to make the programme more beneficial to the farmers.

A review of the Programme implementation during the VIII and IX Five Year Plan periods revealed that the micro level distribution network for supply of water to individual holdings had been created in about 16 million ha and rotational supply of irrigation water had been enforced in about 11 million ha. A number of constraints such as unreliability of water supply at the outlet due to the deficiencies in the irrigation system above the outlet, absence of link and intermediate drains to let out surplus water into main drains, non-inclusion of minor irrigation projects from non-hilly areas, low priority by the State Governments to extension and training activities, non-revision of cost norms for various activities since VIII Plan etc. were also noticed during the review. In view of these constraints, the programme was restructured for the remaining period of X Plan (2004-07) and renamed as 'Command Area Development and Water Management Programme (CADWM Programme)' to make it more comprehensive and beneficial to farmers. Ministry of Water Resources, Government of India is the implementing authority of the programme.

The main objectives covered under the programme are:-

- Bridge the gap between potential created and their utilization through micro level infrastructure development and efficient farm water management practices.
- Optimization of agricultural productivity & production, and
- Improvement in socio-economic conditions of farmers

CAD Coverage

Initially, 60 major and medium irrigation projects were taken up under CAD Programme (starting 1974-75), covering a Culturable Command Area (CCA) of about 15.00 million hectare. After inclusion of new projects, deletion of completed projects and clubbing of some projects, there were 145 active projects with CCA of 16.02 mha, which eventually now covers CCA of 22.16 million hectares spread over 23 States and 2 Union Territories. It was implemented as a State Sector Scheme during the XI Five Year Plan (2008-09 to 2011-12).

Main Components of Command Area Development

The Programme includes the following components:-

- a. On-Farm Development (OFD) works i.e. Development of field channels and field drains within the command of each outlet; land leveling; reclamation of waterlogged areas (since April 1996); enforcement of a proper system of Warabandi and fair distribution of water to the fields; realignment of field boundaries wherever necessary (if possible, consolidation of holding); supply of all inputs and services including credit; strengthening of extension services; and, encouraging farmers for participatory irrigation management (PIM).
- b. Selection and introduction of suitable cropping pattern.
- c. Development of groundwater to supplement surface irrigation.
- d. Modernization, maintenance and efficient operation of the irrigation system upto the outlet of one-cusec capacity (irrigation sector).
- e. Correction of System Deficiencies

- f. Desilting of Tanks in CAD Commands for augmenting supplies
- g. Bio-Drainage (selective areas).

CAD Implementation

The Command Area Development Wing of the Ministry of Water Resources coordinates and monitors the implementation of CADWM at the national level. Proposals received from the States for inclusion of new projects under the programme are examined and, if found techno-economically feasible, are included. The Progress is measured through physical and financial progress reports of the programme as received from the States; and, the quality of works is ensured through technical guidelines and suggestions provided to the State functionaries from time to time and through various meetings, workshops, seminars, etc. In the States, the Programme is being implemented through Command Area Development Authorities (CADAs). However, in some States, namely Arunachal Pradesh, Himachal Pradesh,

Technical details about the components of CADWM

Hardware Components (50:50 share between Centre and States)

i. CAD Establishment

The total cost on establishment of CAD Authorities at project level and the CAD and Water Utilization Departments and Monitoring Cell for monitoring of CADWM at the State level are to be kept at the minimum. The cost of establishment should not exceed 20% of the expenditure on works items. The expenditure on establishment, if any, over and above 20% has to be met by the State Governments from their budgets.

ii. One-time functional grants to Water Users' Associations

- a) Farmers themselves need to maintain field channels and field drains constructed under the programme in the subsequent years. It is, therefore, essential to involve WUAs in the planning and execution of OFD works, equitable distribution of irrigation water among all the land holders of an outlet command and repair/ maintenance of the distribution network after the same is handed over to them for management. Formation of WUAs is mandatory for implementing CADWM Programme. In formation of WUAs, the Panchayat representative should also be included as member.
- b) To facilitate the working of WUAs, a provision has been made for one-time Functional Grant of Rs.1000 per ha. (Rs.450 per ha by Centre, Rs.450/- per ha by the State and Rs.100/- per ha by the farmers). The Functional Grant will be given where WUAs are formed, registered and actually engaged in distribution of water. The amount would be deposited in the fixed deposit account of Water Users' Associations in the bank and interest accrued thereon would be used for the activities of WUAs.

iii. Enforcement of Warabandi

- a) The CAD Authority should enforce Warabandi below the outlets. Integrated water management including supply from the head regulator of main canal up to the farm

gates should be considered as a single unit. Effective coordination with the irrigation staff is necessary in working out operation plan for the main system, which would be in conformity with the warabandi schedules prepared below the outlets.

- b) Central assistance for enforcement of warabandi is not available since 1.4.2004. The expenditure on regulatory/control structures to be installed for enforcement of warabandi can however be met from the component relating to the correction of system deficiencies above the outlet upto the distributaries of 150 cusec capacity. The regulatory structures could be: – Construction of Adjustable Proportionate Modules (APMs) at outlet head and measuring devices in field channel like parshall flumes, notches (rectangular or trapezoidal) or weirs depending upon situation.

iv. Survey, Planning and Design

Topographic survey is meant for proper planning and designing of OFD works so as to ensure their quality. Soil survey is meant for land capability classification so as to understand their capability for crop planning and undertake proper treatment measures to realize their full potential. Proper topographic and soil survey maps of the project should be maintained in CADA records.

v. On-Farm Development

These works comprise the construction of field channels and also the land leveling/shaping and realignment of field boundaries

- a) This is an important activity under the Programme for efficient utilization of irrigation water. Properly planned, aligned and designed field channels should be constructed from the outlet in a manner that each and every field of the outlet command is connected by field channel. The assistance would be available for construction of field channels with related structures like cistern, measuring devices, drop structures, division boxes, turnouts, flumes, culverts, inverted siphons, subject to the prescribed cost norms. As a general guideline, a minimum of 20% length of the field channels may be lined, the length of lined channels may be less or more than 20% according to the actual conditions and subject to prescribed cost ceiling per ha. The Central assistance will be limited only to the prescribed cost norms and any additional cost involved will have to be borne by the State Governments.
- b) To promote water use efficiency in irrigation, financial assistance can also be availed by the States for development of infrastructure to facilitate use of sprinkler / drip irrigation systems as an alternative to construction of field channels. The assistance under this item will not be admissible for sprinkler and drip irrigation systems but will be limited to construction of stilling tank, pump house and laying conveyance pipes from outlets upto farmers' fields. The cost norms as applicable for On-Farm Development (OFD) works will also be applicable for such works.

vi. Field, Intermediate and Link Drains

The expenditure under this component would be admissible on field drains from individual fields and other intermediate/link drains to provide connectivity to the main drains.

vii. Reclamation of Waterlogged Areas

- a) The problem of waterlogging in the Commands of irrigation projects has affected the health of soil and reduced the agricultural productivity considerably. Central assistance to States is therefore being provided for reclamation of the waterlogged areas in the irrigated command of the projects covered under CADWM Programme.

The items of work under this scheme are:

- a. Assessment of problem areas in the commands of irrigation projects.
- b. Planning and designing for preventive and reclamation measures.
- c. Taking up the preventive and remedial activities like land management, drainage (surface, sub-surface, vertical etc.).
- d. Monitoring and evaluation.

b. A component on bio-drainage has also been added w.e.f 1.4.2004. Wherever feasible, bio-drainage techniques in conjunction with the conventional techniques are to be used for reclamation of the waterlogged areas.

c. Prior approval of the Government of India will be necessary before undertaking any reclamation work. A consolidated proposal for all the pockets of a project where reclamation work has to be taken up is to be prepared. The proposal so prepared is to be discussed in the State level committee and then sent to the regional office of CWC and to the Ministry. Upon recommendations of the CWC, the multi-disciplinary Core Group of the Ministry will consider the proposal for approval.

viii. Correction of system deficiencies

- a) A number of irrigation projects in the country have been operating much below their potential due to the shortage of funds for O&M related activities such as cleaning of the channels by de-silting and weeding, strengthening of banks in filling sections, etc. This has been by and large responsible for unreliability in availability of irrigation water at farm level and consequently the reduced irrigation efficiency. The scope of the CADWM Programme has, therefore, been expanded to take care of the system deficiencies occurring above the outlet up to distributaries of 4.25 cumec (150 cusec) capacity.
- b) The State Governments will be required to ensure that distributary Committees are formed, who can take over these distributaries for operation and maintenance, after these have been rehabilitated. Work on this item is to be executed with distributary as a unit and preferably on those distributaries where all outlets have been saturated and the OFD works have been handed over to WUAs.

Software Components (75: 25 share between Centre and States)

i. Adaptive Trials and Demonstrations

Appropriate water management practices at the field level, usually called on-farm water management, which include preparation of fields to receive irrigation water, improved methods of irrigation such as border strips, check basins, furrows, determining the optimal length of fields, suitable stream size etc. are required to be experimented in different locations and demonstrated for the benefit of farmers. Working out appropriate frequencies and water dosages for different crops, evolving water allowances in the command after considering the total water available, field application losses as well as the conveyance losses so as to ensure equity in distribution of water in various subcommands as well as among the farmers can also be experimented under these trials. Training farmers in respect of irrigated agriculture, switching over from rain fed crops with low risk-low inputs to high inputs high risk irrigated crops so as to increase yields as well as profits is required to be included in these trials.

ii. Training

a. Staff of irrigation department at management level, field staff and functionaries of CAD Authorities would need training in improving the deliveries from the main system, on-farm water management, enforcement of Warabandi, planning & designing of OFD works, PIM, etc. The farmers would also need training in distribution of water below the outlet or minor and maintenance of field channels/field drains, use of improved water management and agricultural practices.

b. The superintending engineers, executive engineers and deputy engineers can be trained at the respective WALMIs in the states but the field level staff and farmers need to be trained at the project level. Project level training centers therefore are to be set up for imparting training in respect of the activities or works entrusted to the various categories of staff so as to improve their capabilities and also to ensure effective quality control. The job can also be entrusted to WALMIs/ other central and State Agencies wherever feasible. The farmers particularly the members of the executive body of WUAs and members of the minor/distributary committees may be trained in irrigated crops, crop rotations, proper sowing times, crop water-soil relationship, warabandi, PIM and maintenance of field channels/drains. This can be done by organizing 3-5 days workshops, training, etc.

Implementing CADWM in a Holistic Manner

- a) Water Users' Associations are to be formed before taking up OFD activities.
- b) OFD Works must be implemented with the active involvement of WUAs and handed over to them after their completion.
- c) Field link and intermediate drains are to be simultaneously constructed along with OFD works wherever required.
- d) WALMIs are to be intimately involved in training and other related activities.

- e) After OFD works have been completed and all outlets are saturated, an MOU must be signed between Minor/distributary committees and Irrigation departments for future maintenance.

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