

WATER RESOURCES DAY 1991

PROVISION FOR DRINKING WATER SUPPLY SYSTEM IN MULTIPURPOSE AND IRRIGATION PROJECTS GUIDE LINES



CENTRAL WATER COMMISSION

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MULTIPURPOSE AND IRRIGATION PROJECTS

GUIDELINES

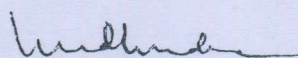
Ram K. Maheshwari
22/4

CENTRAL WATER COMMISSION

FOREWORD

Despite the National Water Policy adopting in 1987, giving top priority for allocation of water for drinking purposes in the planning of irrigation and multipurpose projects and also that the States having recognised the same in their planning, it is felt that specific guidelines are formulated and issued as to the manner of integration of the system for supply of drinking water physically and operationally with the canal network, which would further facilitate in accelerating the process. With this in view, the Project Appraisal Organisation of Central Water Commission have prepared these guidelines which, it is hoped, would prove useful.

New Delhi
March 1991


(C. Sudhindra)
Member (P&P)
Central Water Commission

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PROVISION FOR DRINKING WATER IN IRRIGATION AND MULTIPURPOSE PROJECTS - GUIDELINES FOR INTEGRATION OF DRINKING WATER SUPPLY SYSTEM

1. INTRODUCTION

The National Water Policy has laid down that in all water resources development projects, provision for drinking water should be primary consideration and that irrigation and multipurpose projects should invariably include a drinking water component, wherever there is no alternative sources of drinking water. Drinking water needs of human beings and animals should be a first charge on any available water.

To operationalise these recommendations at the project formulation stage and to provide requisite infrastructural facilities for carrying water to the demand centres, concrete steps are required to be taken.

Instructions had already been given to the State Governments that in view of the needs to improve the quality of project formulation and strengthen the institutional arrangements for this purpose, a multi disciplinary unit for project preparation be set up. To ensure that drinking water requirements are suitably provided for in any project formulation, the State Governments were requested to include experts of urban/rural water supply departments in the multi disciplinary units being set up (see Annexure I, II and III).

Even though drinking water has been given first priority and reservations for requirements of drinking water are also being made by the State Governments while formulating the projects, in the absence of specific guidelines as to in what manner the system for supply of drinking water should be physically and operationally integrated with the canal network for irrigation supplies, the provisions for drinking water has remained many times confined to the project proposals and the water supply system does not take shape on the ground in a systematic manner.

It is, therefore, considered necessary that broad guidelines should be laid down for drawal of water for drinking purposes in the irrigation/multipurpose projects.

2. GUIDELINES FOR INTEGRATION OF DRINKING WATER SUPPLY SYSTEM

The following guidelines are suggested:-

2.1 Setting up of Multi Disciplinary Units in the States

Multi disciplinary units should be set up in each State with a view

to improve the quality of project formulation and strengthen the institutional arrangements for this purpose. To ensure that the drinking water requirements both urban and rural are suitably provided for in the project formulation, experts of urban/rural water supply department should be included in the multi disciplinary unit. This should ensure effective co-ordination with other agencies connected with project formulation.

2.2 Formulation of Urban/Rural Water Supply Components

- a) The State Water Supply and Public Health Engineering Department, while investigating and formulating urban/rural water supply projects should lay emphasis on inclusion of drinking water supply as one of the components of irrigation and multi purpose projects. They should, therefore, make co-ordinated efforts with the State Irrigation Department. The State Irrigation Departments should on their part inform the Public Health Department as soon as any irrigation/multipurpose project is conceived, the broad details of the project indicating the location, the gross command area of the project etc. This will enable the State Public Health Department to furnish the requirements for drinking water supply to be provided for in the proposed project. Norms prescribed by Ministry of Urban and Rural Development would be followed for working out the domestic water needs of human and cattle.
- b) The State Irrigation Department, after the project proposals are finalised, will make available a copy of the project report to the Public Health Department indicating rough alignment of canals and its distributary systems as also the salient features of the reservoir. This will enable the Public Health Department to frame their proposals for drawal of water and project a realistic requirement of water to be drawn from the project for drinking purposes.
- c) Taking into consideration the project proposals of the Irrigation Department, the Public Health Department would decide whether to draw the drinking water requirements from the reservoir (headworks) or from the main canal and its distribution system or both as also the points of drawal of water.
- d) The type of water conductor system to be adopted viz. by open channel or underground pipe system will also be considered. This is necessary to assess the losses in the transit.
- e) Depending on the mode of drawal of water, the water conductor system would have to be designed. If the water is to be drawn from the reservoir, the water conductor system is to be designed for the normal need of drinking requirements. In case it is to be drawn from the canal system the water conductor system is to take into account the requirements during the canal closure period for maintenance and repairs and also during the period when no water is drawn in the canal for irrigation purposes. The drinking water requirements during these periods will be met with by utilising the existing storages like tanks etc. or creating new storages. The storage capacity requirements would be

for one month requirement (during closure period for maintenance and repairs) or full requirements for the period when the canal is not running.

- f) The location and details of storages to be created are to be identified by the Public Health Department and indicated to the Irrigation or W.R. Department of respective States.
- g) When the water supply is to be drawn from the canal system it must take into consideration that the water may be siphoned off in the higher reaches particularly during the dry season when the canal is not running full. In such cases construction of a by-pass canal or pipe system should be considered. In the case of closed conduit systems, there will be no piping and contamination is also prevented.
- h) Supplies for drinking water should be drawn from a canal or a branch whose design discharge capacity is more than 5 times the drinking water requirements subject to a minimum of 2 cumecs.
- i) As far as possible drawal of water for drinking purposes downstream of the urban settlements should be avoided as these are potential sources of contamination.

2.3 Projection of Drinking Water Requirements

The requirements for drinking water are generally projected for a period of about 30 years. However, the reservoir projects are planned, considering that life of the reservoir is 100 years for Major Projects and 50 years for Medium Projects. It would therefore be desirable that provisions for drinking water requirements should also be made accordingly in consultation with concerned State Departments. The drinking water requirements should take into account the transit losses in the conveyance system and also evaporation losses in the storages to be created. Generally the drinking water supply component should be taken up and completed simultaneously with the canal system for irrigation. Till such time the water supply component is not ready, the water earmarked for drinking purposes can be utilised for irrigation.

2.4 Apportionment of Cost of Irrigation/Multipurpose Projects to Water Supply Component

As already mentioned above, in planning of irrigation/multipurpose projects, primary consideration should be given to provision for drinking water supply.

For apportionment of cost of irrigation/multipurpose projects to the water supply component the procedure as indicated by the then Ministry of I & P (Govt. of India) in their letter No.1(6)/62-Policy, dated 17th April, 1967, addressed to all the State Govts. may be adopted (See Annexure-IV).

2.5 Implementation of Water Supply Components

For the best utilisation of available water, the water supply component should take final shape concurrently alongwith the irrigation project. It is

necessary to see to it that the structures needed for water supply components are taken up alongwith the irrigation project to avoid remodelling at a later stage involving more cost. In case the water supply component is to be implemented at a later date, their outlet structures at the headworks and also along the canal and its distributary system must be identified before the headworks and the canal systems is completed. It is necessary to construct these outlets alongwith the irrigation project to avoid disruption of irrigation during the construction of such outlet structures at a later stage. Also it may not be advisable to open out main or branch canal banks for the construction of outlet structures. Cost of all such structures to be executed by the Irrigation Department as per the specifications of the Public Health Departments is to be borne by the Public Health Departments.

Suitable Plan provisions should be made for these water supply components and funds made available by the State Public Health Department so that the work on these progresses side by side with the irrigation project.

3. CONTINGENCY MEASURES

All the projects are generally planned for drinking water supply component at 95% dependability. As such normally the projects planned should cater to the drinking water supply needs for which it has been planned. However, it is likely that in certain years especially during drought years, there may be problem in meeting the drinking water requirements. To overcome such a contingency, following provisions are suggested:

- i) The intake structures should be provided with inlets well below the MDDL for drawal of water for drinking purposes from dead storage.
- ii) Permanent compartmentation of reservoir, to minimise evaporation losses may be considered in drought prone areas.
- iii) Existing wells in the reservoir area should be sealed with RCC and a manhole so that they could be utilised for drinking water when required.
- iv) Utilisation of underground storage available in the faults/fractures within the reservoir and downstream of the dam has to be planned in advance on the basis of appropriate maps.
- v) Provision for seepage lifting may be incorporated in the design.
- vi) Sluices in the reservoir shall be provided for releasing waters so that drinking water requirements downstream of the reservoir are not affected.

Annexure-I

No.16/35/86/PA/
Government of India
Central Water Commission
Project Appraisal Directorate-I

Sewa Bhawan, R.K.Puram,
New Delhi - 110 066

Dated 2nd January, 1987
February,

To

The Secretary to the
Government of _____,
Irrigation Department,

_____.

Sub:- Provision for requirements of drinking water supply
in Irrigation and Multipurpose Storage - Reservoirs.

Sir,

As you are aware, in our overall water policy, water supply for domestic purposes has been given high priority. In this context, the recommendations of the National Conference of Irrigation and Water Resources Ministers of States and Union Territories held in New Delhi in July, 1986, are reproduced as under:-

"Irrigation and multipurpose projects have the potential of serving as source of drinking water supply, fisheries development and as places of tourist attraction in the reservoir areas. The conference, therefore, recommended that (i) project should specifically provide for requirements of drinking water supply, wherever there is no alternative source of drinking water....."

In view of the above, it is requested that provision for drinking water supply may please be given due consideration in consultation with the concerned public health authorities and suitable provisions for the same made in all projects.

Yours faithfully,

Sd/-
(VIR AMAR PRAKASH)
MEMBER (P&P)

Copy to all Officers in PAO, Irrigation and PP Cells.

No.6/8/86-P.II
Government of India
Ministry of Water Resources

New Delhi, the 11th February, 1987

To

The Chief Secretary,
Government of _____,
_____,
_____.

Sub: Inclusion of drinking water component in Irrigation
and Multipurpose Projects - regarding.

Sir,

I am directed to say that in the guidelines issued by the Planning Commission and other Central Ministries/Departments for preparation of Project reports on Irrigation and Multipurpose Projects, emphasis has been laid on inclusion of drinking water supply as one of its component in such projects. This subject was further discussed at the National Conference of State Irrigation and Water Resources Ministers, held in July, 1986, when it was recommended that such projects should specifically provide for requirements of drinking water supply wherever there were no alternative sources. Some concrete steps are required to be taken to operationalise the above guidelines and recommendations at the project formulation stage and to provide requisite infrastructural facilities for carrying water to the demand centres.

2. In the meeting of State Secretaries of Irrigation and Water Resources held in September, 1986, it was felt that in view of the need to improve the quality of project formulation and strengthen the institutional arrangements for this purpose, a multi-disciplinary unit for project preparation is necessary at the state level. I hope that in pursuance of this action is being taking for setting up such multi-disciplinary units in your State. In this context, your attention is drawn to the urgent need for keeping in view the drinking water supply requirements, both urban and rural, while formulating any irrigation scheme. To ensure that the drinking water requirements are suitably provided for in project formulation, it is imperative that experts of Urban/Rural Water Supply Departments are included in the multi-disciplinary teams referred to above. This would ensure effective coordination with other agencies connected with project formulation.

3. Further, sometimes conflicts may arise between the irrigation and the drinking water supply demands. It has been observed that the Irrigation Department and the Water Supply Department at the State level tend to work in isolation from each other, and many times, the drinking water needs are not given the overriding priority they deserve while operating the irrigation system. It has also been noticed that even in place of scarcity of drinking water, new ground water schemes are being executed for development of irrigation facilities, thereby aggravating the problems. It is, therefore, requested

that a coordination Mechanism between irrigation and other water user departments may be established at the State level so that drinking water supply requirements are accorded high priority.

Yours faithfully,

Sd/-

(RAMASWAMY R.IYER)

SECRETARY TO THE GOVERNMENT OF INDIA

Copy forwarded to:-

- | | |
|--|--|
| 1. Secretary, Ministry of Urban Development, New Delhi. | Y In this connection Para 7(i) Y of the Summary record of dis- |
| 2. Secretary, Department of Rural Develop- ment, New Delhi. | Y cussions at the Second Y Coordination meeting Y circulated with this |
| 3. Chairman, Central Water Commission, New Delhi. | Y Ministry's Memorandum Y No.6/3/86-P.II dated |
| 4. Chairman, Central Ground Water Board, New Delhi. | Y 15th January, 1987 Y may kindly be referred Y to. |
| 5. Adviser(I&CAD), Planning Commission, New Delhi. | |

Copy also to:-

1. P.S. to Secretary(WR)/Additional Secretaries(WR).
2. Commissioner(PR)/CE(MI)/CE(CAD)/CE(WM).

Sd/-

(G. V. RAO)

Deputy Secretary to the Government of India

Annexure-III

No.Z-15012/82/86-CPHEEO
Government of India
Ministry of Urban Development
(CPHEEO)

Nirman Bhavan,
New Delhi - 110001,
Dated March, 05, 1987.

To

All the Managing Directors and
Chief Engineers of Water Supply and
Sewerage Department and Public Health
Engineering Departments of States/U.T.

Sub:- Directives from the Ministry of Water Resources
regarding inclusion of drinking water component
in irrigation and multipurpose projects.

Sir,

Please find enclosed a copy of the letter from the Secretary,
Ministry of Water Resources, Government of India, addressed to the Chief
Secretaries of all the States and Union Territories regarding directives for
inclusion of drinking water component in irrigation and multipurpose projects.

It is requested that while investigating and formulating urban/
rural water supply projects, the emphasis has to be laid on inclusion of
drinking water supply as one of the components of irrigation and multipurpose
projects. It is suggested that for this purpose coordinated efforts may be
made with the irrigation or concerned departments of the State Government to
include drinking water supply as one of the components of the projects.
Other details regarding the inclusion of drinking water component in irriga-
tion and multipurpose projects has already been highlighted in the enclosed
letter.

Yours faithfully,

Encl:as above.

Sd/-
(Dr. S.R.SHUKLA)
DEPUTY ADVISER(PHE)
Telephone:3016418

Copy for information to Chairman, Central Water Commission, R.K.Puram,
New Delhi.

Annexure-IV

COPY OF LETTER NO.1(6)/62-POLICY DATED APRIL, 17, 1967 FROM THE GOVERNMENT OF INDIA, MINISTRY OF IRRIGATION AND POWER, NEW DELHI TO ALL STATE GOVERNMENTS, DEALING WITH IRRIGATION AND POWER.

Subject:- Appointment of cost and allotment of reservoir storage space in multipurpose projects.

I am directed to say that the question of apportionment of cost and allotment of reservoir storage space of hydropower irrigation, navigation and flood control in multipurpose project has been engaging the attention of the Government for quite some time and question has also been considered at the various all India Irrigation and Power Seminars attended by the representative of the Central and State Government and by the special committee set up for the purpose. In the light of these discussions a procedure has been drawn up for the apportionment of cost and allotment of reservoir storage space as indicated in the succeeding paragraphs which may kindly be adopted by the State Government.

- I(1) A UNIFORM METHOD OF COST ALLOCATION SHOULD BE MADE APPLICABLE TO ALL THE PROJECTS.
- (2) The cost of multipurpose river valley projects should normally be allocated to only three main functions viz. (i) irrigation (ii) power and (iii) flood control. The other functions, like water supply for domestic or industrial uses, navigation, pisciculture, recreation and wild life protection, etc. should be included in one of these three functions. The share of cost and any revenue that should be accounted for in the share of the same function. However, where the cost of any of the subsidiary functions exceeds 10% of the total cost of the project such a function should be treated as an additional main function and cost allocated to it separately.
- (3) Mainly, there are three methods of allocation.
- i) Alternative justifiable expenditure methods.
 - ii) Separable cost remaining benefits methods.
 - iii) Facilities used method.

The facilities used method of allocation of the joint costs is recommended. Of the several ways of assessing the facilities used, the following two most common ones, individually or in combination, as required may be adopted.

- i) Reservoir capacity used by each purpose, and
 - ii) The quantity of water utilised for each purpose.
- (4) The capacity of the reservoir of the quantities of water used for different functions suitably weighted by considerations of adjust-

ments made in the pattern of releases in the interests of these functions, should be the basis for allocation of common cost. Such distribution of cost among various functions has to be done for each unit, like dam, canal, weir, etc. separately and not for the project as a whole.

- (5) The case where the benefits in respect of a particular function are not commensurate with the costs so debitable, suitable adjustments may be made between the allocation of common costs.
- (6) A review of the cost allocated to the functions would be justified if and when there is significant change in use of facilities by the various functions concerned.

II. STAGE CONSTRUCTION IN A VALLEY DEVELOPMENT

When phased development of project is envisaged, cost allocation should be done on the basis of proposals to be implemented immediately. When a subsequent phase of development of a scheme takes place, the cost should be reallocated accordingly. Reallocation should also be done when the scope of the project is modified. In case one of the functions of a project gets deferred, the specific cost incurred for that function only together with the interest thereon, should be charged to it and the joint cost should be reallocated when the deferred function comes into operation. At the time of such reallocation the joint cost should be taken as the sum at charge at that time or the original joint cost modified on the basis of the then current construction cost index, whichever is less.

III. MULTIPURPOSE PROJECT CONCERNING MORE THAN ONE STAGE

The basis of allocation should be the same whether the beneficiary is one State or more than one State.

IV. VARIATION IN ALLOCATION WHEN COMPLETION COSTS AND FULL BENEFITS ARE FIRMLY EVALUATED

The cost of allocation should be done at the time of finalisation of the estimates but should be readjusted according to actual expenditure on the completion of the project.

V. AGENCY FOR DETERMINING ALLOCATION

The partners in the project should determine the cost allocation. In case of disagreement; among them the matter should be referred to a party acceptable to all concerned.

VI. COST ALLOCATION WHEN THE CAPACITY RESERVED FOR FLOOD IS PUT TO USE DURING NON-FLOOD SEASON

Encroachment on space reserved for floods should not be permitted during the specified flood season. But if, after the specified flood season, the inflow is more than the withdrawal, the reservoir space earmarked for floods may be utilised for other purposes by agreement. No extra cost should

be debitable to other functions for such use, except when

- i) The project provides for filling in the space reserved for flood control after the end of the specified flood season,
- ii) The filling of a portion or the flood space, subsequently agreed upon, is more or less on an ensured basis.

It is requested that the manner of allocation of cost and the specific allocation suggested should be clearly indicated in the project reports which are sent to the Government of India for approval of the scheme.

