

Technical Advisory Committee

The Governing Body of the NWDA Society has constituted a Technical Advisory Committee (TAC) of NWDA under the Chairmanship of Chairman, Central Water Commission, for examination and scrutiny of the various technical proposals framed by the Agency. Governing Body of NWDA, during its 48th meeting held on 10.3.2006 has approved inclusion of Engineer-in-Chief, Water Resources Department, Govt. of Chhattisgarh; Chief Engineer, Irrigation Department, Govt. of Uttarakhand; and Engineer-in-Chief, Water Resources Department, Govt. of Jharkhand as Special Invitees in the TAC. Forty two meetings of TAC of NWDA have been held so far.

Members of the Technical Advisory Committee of NWDA

1.	Chairman, Central Water Commission, New Delhi	Chairman
2.	Member (WP&P), Central Water Commission, New Delhi	Member
3.	Member (D&R), Central Water Commission, New Delhi	Member
4.	Member (HE), Central Electricity Authority, New Delhi	Member
5.	Joint Secretary, Deptt. Of Agriculture & Co-operation, New Delhi	Member
6.	Advisor (IA), Ministry of Environment & Forests, New Delhi	Member
7.	Director General, Geological Survey of India, Kolkata	Member
8.	Chairman, Central Ground Water Board, Faridabad	Member
9.	Director General, India Meteorological Department, New Delhi	Member
10.	Director/Scientist (F), National Institute of Hydrology, Roorkee	Member
11.	Chairman, Inland Water Ways Authority of India, Noida	Member
12.	Director General, National Water Development Agency, New Delhi	Member-Secretary

Special Invitees

13.	Chief Engineer (Water Resources), Irrigation Department, Govt. of Uttar Pradesh
14.	Chief Engineer & Joint Secretary, Narmada and Water Resources Department, Govt. of Gujarat
15.	Engineer-in-Chief (Interstate & Water Resources), Irrigation Department, Govt. of Andhra Pradesh
16.	Engineer-in-Chief (Bodhi), Water Resources Department, Govt. of Madhya Pradesh
17.	Chief Engineer (Water Resources) & Joint Secretary, Irrigation Department, Govt. of Maharashtra
18.	Chief Engineer, Interstate Water, Government of Kerala
19.	Chief Engineer (Irrigation, Design & Research), Irrigation Unit, Govt. of Rajasthan
20.	Engineer-in-Chief, Water Resources Organisation, Govt. of Tamil Nadu
21.	Chief Engineer, Central Planning Unit, Department of Irrigation, Govt. of Orissa
22.	Chief Engineer, Irrigation Department, Water Resources Development Organisation, Govt. of Karnataka
23.	Chief Engineer (Lift Canals), Irrigation Department, Govt. of Haryana
24.	Chief Engineer, P .P.Cell, Water Resources Deptt., Govt. of Bihar
25.	Chief Engineer (Design & Research), Irrigation & Waterways Directorate, Govt. of West Bengal
26.	Chief Engineer (P&D), Brahmaputra Board, Guwahati, Assam
27.	Chief Engineer, Irrigation Department, Govt. of Assam
28.	Chief Engineer,(Water Resources), Irrigation Works, Govt. of Punjab
29.	Chief Engineer (I&F),Govt. of NCT of Delhi
30.	Engineer-in-Chief, Water Resources Department, Govt. of Chhattisgarh

31.	Chief Engineer and Head of Department, Irrigation Department, Govt. of Uttarakhand
32.	Engineer-in-Chief, Water Resources Department, Govt. of Jharkhand

Compilation of Technical Guidance Provided by TAC, NWDA

During deliberations in different TAC Meetings of NWDA a number of guidelines on the procedures/practices to be adopted on various important aspects for preparation of Water Balance Reports, Pre-feasibility/Feasibility Reports etc. have been approved from time to time. Date on which various TAC Meetings were held (since inception of NWDA) is given at Annexure-I.

The guidelines provided by various TAC Meetings of NWDA are:

I. Soils, Land Use, Delta and Water Use:

1. The permanent pastures and other grazing land need not be included in the culturable area of the basins / sub-basins and no separate provision would be necessary for irrigating the permanent pastures and other grazing lands (9th TAC).
2. The present practice of obtaining land use data of the basins from the land use statistics collected by the Directorate of Economics and Agriculture Statistics of various states may be continued by the NWDA (9th TAC).
3. Fodder crops should be included in the cropping patterns recommended by the NWDA in the water balance studies (9th TAC).
4. The procedure adopted by the NWDA for arriving at the proposed cropping pattern of major and medium projects may continue (10th TAC).
5. The overall delta for major, medium and minor projects should be computed based on climatological data of the stations present in or adjacent to the basin/sub-basin. To work out the delta of minor projects, an irrigation efficiency of 80% and evaporation losses at 10% of the water withdrawals from the storages may be assumed (10th TAC).

6. The culturable command area (CCA) need not be projected to 2025 AD and it would be adequate to consider the maximum culturable area of recent years (11th TAC).
7. If the variation in catchment area of any basin/ sub-basin between NWDA and State Govts. figures is within 5% there is no need to revise the figures (12th TAC).
8. The IMD values of Potential Evapotranspiration (PE) published by IMD may be used for computing crop water requirement of future identified major, medium and minor projects (12th TAC).
9. It was agreed that in case of such future projects for which project reports have already been approved by CWC, the cropping pattern as given therein should be considered and for other future projects cropping pattern will be based on the availability of water and carrying capacity of soils (15th TAC).
10. In case of future studies conveyance efficiencies of 65% for major and medium projects and 80% for minor projects will be considered while working out GIR for paddy crops. The studies already completed by NWDA need not be revised in view of insignificant change with the existing and proposed methods (17th TAC).
11. The water requirement may be worked out on the basis of suggested cropping pattern and by the climatological approach as per the present practice (22nd TAC).
12. The practice of providing 20% of Rabi area with 50mm for pre-sowing irrigation in future project would be enough for planning purposes (24th TAC).

II. Computation of Yield

1. The yield studies carried by using the rainfall-runoff correlations taking monsoon months as a whole would be continued by the NWDA at present. Wherever monthly rainfall-runoff correlations are obtained by the NWDA for any sub-basin, multiple correlations should be considered (9th TAC).
2. In case where there are no G&D sites or the existing G&D sites cover only a small portion of the catchments, rainfall-runoff relationship obtained for the

adjoining hydrometeorologically similar basin/ sub-basin may be adopted (10th TAC).

3. Separate hydrological and water balance studies would not be necessary at the State boundaries for various basins/sub-basins (10th TAC).
4. Regeneration from upstream utilisation of both inbasin and imported waters should be considered in the assessment of virgin yields (10th TAC).
5. While presenting the requirements of projects present within sub-basins and basins, the allocations indicated by the awards/agreements will be retained in the studies without any change (10th TAC).
6. The surface water yield need not be worked out at the state boundaries. The existing procedure for deciding the best-fit equations on the basis of the minimum standard error of estimate might continue (11th TAC).
7. Hydrological studies may be updated after a period of 10 years when additional data will be available (17th TAC).
8. Though the computer programmes of all the alternative methods have been developed but for water balance studies linear/non-linear type of correlation, which have already been used could continue (18th TAC).
9. Import/Export: - While updating the water balance studies export/import of one sub-basin may be compared with the figures for corresponding basin/ sub-basins. Unallocated export/import may be reconciled. The hydrological checks as above may be made for the import/ export figures also (22nd TAC).

III. Water Availability

1. The water balance study of the NWDA may project water availability at both 75% and 50% dependability. However, the proposed schemes should provide for a 75% success rate (7th TAC).
2. The NWDA reports might consider the water resources available in the basin to be the sum of gross monsoon surface water yield and replenishable groundwater

potential. For any transfer of surplus water outside the basin, the monsoon flows in the basin will figure in practice (10th TAC).

3. The water balance studies may be updated after a period of 10 years when additional data become available (17th TAC).

Water availability upto the project site to be checked on the basis of the following

- I. Flow series are based on observed data and corrected for existing utilization
- II. Extended flow series are based on rainfall-runoff correlations for the project site.
- III. Extended flow series based on rainfall-runoff correlations for the nearest hydrometeorologically similar watershed.

IV. Prorata Basis

- 50% and 75% yield computed as above may further be adjusted for the ultimate utilizations upstream, exports and imports to compute 50% and 75% dependable availability.
- Water utilizations for any project should be restricted to a maximum of 75% dependable availability in case of diversions. However, for storage projects requirement may exceed 75% dependable availability with provisions of carryover storage.
- Suitability of dam site: This aspect may be accepted as per the information provided by the State Governments/Master Plan (22nd TAC).

IV. Groundwater

1. The groundwater potential may be left to the states and may not be considered as an available resource for the water balance studies being done by NWDA (7th TAC).

2. While the water balance reports may deal with the groundwater availability, the existing and projected uses etc. as in the earlier reports, data and findings should be presented state-wise and no attempts should be made to assess or identify any surplus or deficit in groundwater availability in any basin. The groundwater should be left entirely to the concerned states for use (9th TAC).
3. The NWDA studies might consider the groundwater resources potential estimated by the CGWB as per the recommendations of the Groundwater Estimation Committee, 1984, wherever no specific study or findings were available on the extractable groundwater in any basin. No corrections will be made for base flow since the CGWB have already incorporated necessary corrections in base flow in the groundwater assessment made by them (9th TAC).
4. Efforts should be made by the NWDA to prepare groundwater maps for the basins/sub-basins depending upon the availability of data (10th TAC).
5. The NWDA studies may consider the gross groundwater potential of the basin/sub-basin assessed from the statistics supplied by the CGWB/State Groundwater Boards (SGWB) and subtract the domestic and industrial uses estimated by the NWDA to be met from groundwater resources for obtaining the groundwater potential available for irrigation use (10th TAC).
6. The present practice of computing the groundwater potential from tehsilwise/districtwise statistics on the groundwater potential supplied by the CGWB/SGWB will continue. Results of any special studies in respect of basins/sub-basins are also available, the same should be considered by the NWDA (10th TAC).
7. The NWDA reports might consider the water resources available in the basin to be the sum of gross monsoon surface water yield and replenishable groundwater potential. For any transfer of surplus water outside the basin, the monsoon flows in the basin will figure in practice (10th TAC).
8. The groundwater should be continued to be indicated as separate statewide resource. The water resources available for estimating surplus/deficit of any basin/ sub-basin should be taken only as the monsoon and non-monsoon surface flows. For such estimation the awards made by various tribunals for concerned basins should also be kept in view (11th TAC).

9. Water balance studies of deficit sub-basins/basins should be reviewed by NWDA to account for groundwater potential (15th TAC).
10. It was agreed to indicate groundwater as a separate resource (16th TAC).
11. In view of difficulties to assess and quantify the groundwater annual replenishment etc. TAC took a decision not to consider groundwater in the water balance studies of NWDA. Therefore, NWDA should continue the existing practice of considering surface water resource only while estimating water balance in their studies (32nd TAC).

V. Water Requirements

Domestic and industrial water requirement

1. The NWDA studies would consider consumptive use of domestic and industrial uses as 20% and 2.5% respectively of the surface water diverted or lifted from the rivers, reservoirs, storages, canals etc. (7th TAC).
2. The per capita consumption for rural and urban population may be assumed as 70 lts. and 200 lts. respectively, which are based on the recommendations of the Ministry of Works and Housing (10th TAC).
3. The 50% of the rural water requirement and entire livestock water requirement is proposed to be met from groundwater sources. The urban water requirement in full and 50% of the rural water requirement is to be met from surface water sources (11th TAC).
4. Entire industrial water requirement is to be met from surface water sources (11th TAC).
5. The per capita water requirements @ 200 lts. and 70 lts. for urban and rural population adopted in the NWDA studies may be continued for the present, as it made better impact on the overall water availability with 80% of the water returning back to the system (15th TAC).
6. In order to update the water balance studies it was decided that while revising the studies population projections (which are presently upto 2025 AD) may be made upto 2050 AD (22nd TAC).

VI. Salinity Control

1. It was decided as per the clarifications of NWDA to Kerala Govt. that a lump sum provision of 10% of the 75% dependable yield will be earmarked for salinity control tentatively pending detailed studies in this area (14th TAC).

Water releases in the river for environment and ecology

1. Regarding how much quantity of water to be released in the river for environment and ecology, it was decided that this issue may be finalized through an expert committee or by the Ministry of Environment and Forest (17th TAC).
2. After meeting downstream requirements a minimum lean season flow of 10% of the inflow at diversion structures should be maintained for environmental and ecological purposes with storages. This could be of the order of 10% of the average lean season natural flow downstream of the storage (23rd TAC).

VII. Annual Irrigation

1. The intensity of irrigation in the case of existing and ongoing projects will be as per the present use. Under Peninsular river development component for the future projects, the intensity may be assumed as 150% for major projects, 125% for medium projects and 100% for minor projects. The studies should also consider possibility of augmentation in the existing storages to increase the present intensity of irrigation, wherever this is less than the percentages indicated above for the future projects (7th TAC).
2. Any surplus surface water for transfer should be assessed only after considering the water needs of the basin for extending irrigation to 60% of net culturable area (10th TAC).

VIII. Area to be Brought under Irrigation by 2025 AD

1. In water deficit areas, the first attempt should be to cover at least 30% of the culturable area of the basin/ sub-basin by irrigation from surface water (9th TAC)
2. In case of deficit basins/sub-basins, where the percentage of existing irrigation from surface water is around 30% of the culturable area, the NWDA may consider extending irrigation facilities to 60% of the culturable area and the additional area to be brought under irrigation would be for a single dry crop

without considering any high water consuming crop like sugarcane and paddy (9th TAC).

3. Extension of irrigation from 30% to 60% of the culturable area in the deficit areas by way of transfer from other basins should also stand the scrutiny of economic criteria (9th TAC).
4. Before diversion of water, bringing irrigation level of atleast 60% of the culturable area as annual irrigation as being followed in the NWDA studies as decided by the TAC earlier was in order (18th TAC).
5. The command area of each proposed project may be examined with regard to availability of culturable area overlap with other projects etc. at the time of updating the water balance studies (22nd TAC).

IX. Irrigation Water Requirement

1. The water requirement for irrigation should be worked out on climatological approach and reasonable provisions made for the field and transmission losses as well as evaporation from the storages (7th TAC).
2. The NWDA should prepare a brief note on the losses in irrigation canals, both lined and unlined and circulate the same among the members of the TAC for further consideration. The NWDA may meanwhile, continue to adopt a figure of 60% for irrigation efficiency for the water balance studies in respect of major & medium projects (9th TAC).
3. The evaporation losses may be based on the available data for the existing major and medium reservoirs in and around the basin. It was also decided that any figure for evaporation losses which is accepted in Tribunal Awards or agreements between the states may be taken for the NWDA studies for the concerned basin/ sub-basin (9th TAC).
4. It was decided to adopt 20% of the withdrawals from the reservoir as evaporation losses in the absence of actual data. TAC recommended same figure for minor schemes also (11th TAC).

5. The NWDA might adopt an irrigation efficiency of 55% for major and medium irrigation projects with a regeneration value of 10% and an irrigation efficiency of 70% for minor projects without considering any regeneration (11th TAC).

X. Regeneration

1. In the water balance studies carried out by the NWDA, a value of 10% for regeneration from utilization by all major, medium and minor projects should be adopted (7th TAC).
2. In the case of Krishna, Godavari and other basins, where Tribunal Awards are available, the estimated regeneration to the stream for irrigation, domestic, industrial and other uses for the NWDA studies might be as specified in the Award. In the case of other basins/sub-basins, the estimated regeneration in the NWDA studies might be at the rate of 10% of the irrigation use from surface and groundwater and 80% from both of the domestic and industrial uses from surface water resources. No regeneration would be assumed for domestic and industrial uses from groundwater resources (9th TAC).
3. Regeneration would be considered as (i) 10% of the net water utilization for irrigation from all the existing, ongoing and future major and medium projects including those from imported water and (ii) 80% of the domestic and industrial water use met from surface water resources and that no regeneration would be considered from minor irrigation schemes and domestic and industrial use met from groundwater (11th TAC).
4. So far as NWDA studies are concerned, regeneration at the rate of 18% of net utilization should be considered in respect of existing projects and 10% for ongoing and proposed major and medium projects in sub-basins of Cauvery basin (15th TAC).

XI. Special Technical Points related to Himalayan Component Studies

1. Intensity of irrigation:

Considering availability of considerable groundwater potential in the basins of the Himalayan rivers, it was decided that the areas where existing irrigation intensity is less than 100%, the same maybe increased to level of 100% from

surface water. Wherever, the existing intensity of irrigation is more than 100% the intensity can remain at the same level. Additional intensifications over and above those indicated above may be carried out by using groundwater to encourage conjunctive use and to avoid the problems of water logging and salinity (20th TAC).

2. Irrigation in the enroute areas:

The areas enroute of the link canals not covered by any other irrigation scheme may be provided with irrigation to the extent of 100% intensity from the surface water and any additional irrigation by groundwater (20th TAC).

3. Irrigation in the target areas:

The target area should be covered by extensive irrigation and an intensity of not more than 100% should be provided from the transferred water (20th TAC).

4. Water requirements downstream of diversion points:

While carrying out water balance studies at the point, where diversions are contemplated, the water requirements will also include the committed utilizations and additional requirements of downstream areas, which cannot be met from the water available downstream (20th TAC).

5. Seasonal water balance:

Water balance study at diversion points where reservoir is contemplated will be carried out on annual basis as most of the flows can be considered to be regulated. However, at diversion point where reservoirs are not contemplated, water balance study will be carried out on a seasonal basis (20th TAC).

XII Optimum Lifting of Water for Inter Basin Water Transfer Links

It was decided to continue to retain 120 m lift as maximum for planning links, as at present, till more information or report of any special studies is available to the TAC of NWDA (25th TAC).

XIII Guidelines regarding the extent of Surveys and Investigations Necessary for Preparation of Feasibility Report

1. Inter-State links

The guidelines as prepared by NWDA regarding the extent of Surveys and Investigations necessary for preparation of Feasibility Report accepted by the TAC (25th TAC).

2. Intra-State link proposals

Regarding technical guidelines for preparation of PFR/FR of Intra-State links, Director General, NWDA proposed to follow same technical guidelines as adopted for surveys and investigations for preparation of feasibility report of Inter basin water transfer proposal prepared and got approved from TAC in 1996. TAC agreed to use these guide lines for preparation of Feasibility Report of Intra State link proposals also (37th TAC).

Details of dates on which TAC Meetings were held, since Inception of NWDA

TAC Meeting	Date/Venue
1 st	30.11.1983 (New Delhi)
2 nd	22.12.1983 (New Delhi)
3 rd	29.03.1984 (New Delhi)
4 th	31.05.1984 (New Delhi)
5 th	17.09.1984 (New Delhi)
6 th	25.05.1985 (New Delhi)
7 th	01.11.1985 (Nagpur)
8 th	29.05.1986 (New Delhi)
9 th	13.02.1987 (New Delhi)
10 th	29.10.1987 (New Delhi)
11 th	18.08.1988 (New Delhi)
12 th	30.05.1989 (New Delhi)
13 th	20.12.1989 (New Delhi)
14 th	11.10.1990 (New Delhi)
15 th	14.06.1991 (New Delhi)
16 th	28.01.1992 (New Delhi)
17 th	06.08.1992 (New Delhi)
18 th	10.03.1993 (New Delhi)
19 th	26.10.1993 (New Delhi)

20 th	13.05.1994 (New Delhi)
21 st	14.12.1994 (New Delhi)
22 nd	05.06.1995 (New Delhi)
23 rd	11.12.1995 (New Delhi)
24 th	18.06.1996 (New Delhi)
25 th	23.12.1996 (Siliguri)
26 th	01.07.1997 (New Delhi)
27 th	20.02.1998 (New Delhi)
28 th	27.10.1998 (New Delhi)
29 th	02.07.1999 (New Delhi)
30 th	05.07.2000 (New Delhi)
31 st	16.07.2001 (New Delhi)
32 nd	08.09.2003 (New Delhi)
33 rd	02.09.2004 (New Delhi)
34 th	06.09.2005 (New Delhi)
35 th	22.09.2006 (New Delhi)
36 th	19.07.2007 (New Delhi)
37 th	12.09.2008 (New Delhi)
38 th	22.01.2010 (New Delhi)
39 th	24.02.2011 (New Delhi)
40 th	20.01.2012 (New Delhi)
41 st	05.10.2012 (New Delhi)
42 nd	23.05.2016(New Delhi)