

Sharing of Inter-State River: A Case Study of River Narmada

T.R. Nayak

*National Institute of Hydrology, Regional Centre, Bhopal, India
tejramn@yahoo.com*

KEYWORDS

Narmada River, NWDT Award, Utilizable Flow, Interstate Water Disputes

ABSTRACT

The provisions contained in relation to the development and use of waters in our constitution are quite brief and clearly reflects that the issues dealing with water, water supplies, irrigation and canals, drainage and embankments, water storage and water power shall come within the State Government (entry 17 of List-II). The Central Government (Union) shall, however, be entitled to make laws on regulation and development of inter-State rivers and river valleys through passing an Act by Parliament, if it is found to be expedient in the public interest. Since most rivers cross state boundaries, disputes are inevitable. The Interstate Water Disputes Act of 1956 spells out the modalities of adjudication of such disputes. In this paper, sharing of Narmada water amongst the States of Madhya Pradesh, Maharashtra, Gujarat and Rajasthan as stipulated by the Narmada Water Dispute Tribunal (NWDT) Award has been discussed, which was constituted in 1969 to adjudicate upon the water dispute regarding the accounting and sharing of waters of the inter-State River Narmada. The objective of the paper aimed at development of a simple technique to compute the utilizable flow and utilizations of the Narmada water under provisions of the NWDT Award. The knowledge of utilizable flow at the end of monsoon period provides major input for planning of allocations of Narmada water for different uses during the remaining months of the water year. The estimation of utilizable flow at the end of Monsoon period and share of the party States computed through the same procedure have been presented for few water years.

1. INTRODUCTION

Water is most important natural resource required for the survival of all living species on the earth. Fortunately the global water resources follow the hydrological cycle and every year we receive water naturally in fresh form through precipitation. The waters either stored in surface water bodies or flowing through rivers/streams are easily available for use. Most of the rivers flowing through trans administrative boundary either state or nation create some dispute among different states and nations. Though we receive water every year through precipitation, water is limited and not evenly distributed in space and time in relation to the population needs. Hence proper management of water resources is essential to satisfy the current demands as well as to maintain sustainability. Water resources planning and management in the 21st century is becoming difficult due to the conflicting demands from various stakeholder groups, increasing population, rapid urbanization climate change producing shifts in hydrologic cycles. Further variability in runoff in large ungauged inter-state river basins affects water availability to downstream states making management of trans boundary water difficult and sometimes causing geopolitical tension. In most river basin systems, the runoff variability of upper basins caused by natural or human interference is a serious concern in water resources management of all riparian states.

The river water disputes of the modern world are becoming seeds of unending quarrels between countries. They are creating not love and compassion but waves of disharmony and distrust amongst people of neighbouring areas. They have become tools for political one-upmanship and have engendered numerous senseless acts of violence. We have disputes with Pakistan on one side and Bangladesh on the other over utilization of river waters. Even in our own country many rivers which are carriers of life's sustaining waters have become constant sources of friction and dispute between states. Every state tries to utilise as much water as it can, irrespective of the content of Awards, judicial pronouncements and mutual settlements. They necessarily lead not merely to inter-state disputes but also affect the integrity and integration of India.

1.1. The water provisions under the constitution of India

Article 21 of the Indian Constitution guarantees to all persons a fundamental right to life. As Supreme Court observed that right to life is not confined to mere animal existence but extends to the

right to live with basic human dignity. The Supreme Court in while dealing with Article 21 of the Constitution has held that the need for a decent and civilized life includes the right to food, water and a decent environment.

The Supreme Court further observed: "Water is a gift of nature. Human hand cannot be permitted to convert this bounty into a curse, an oppression. The primary use to which water is put being drinking, it would be mocking nature to force the people who live on the bank of a river to remain thirsty. Drinking is the most beneficial use of water and this need is so paramount that it cannot be made subservient to any other use of water, like irrigation. So the right to use of water for domestic purpose would prevail over other needs."

In general, water law in India is largely state based. This is due to the constitutional scheme, which since the Government of India Act, 1935 has in principle given power to the states to legislate in this area. Thus, states have the exclusive power to regulate water supplies, irrigation and canals, drainage and embankments, water storage, hydropower and fisheries. There are nevertheless restrictions with regard to the use of inter-state rivers. Further, the Union is entitled to legislate on certain issues. These include shipping and navigation on national waterways as well as powers to regulate the use of tidal and territorial waters. The Constitution also provides that the Union can legislate with regard to the adjudication of inter-state water disputes. While no substantive clauses could be adopted at the time of the adoption of the Constitution, a specific act, the Inter-State Water Disputes Act was adopted in 1956. The Inter-State Water Disputes Act of 1956 was legislated to deal with conflicts, and included provisions for the establishment of tribunals to adjudicate where direct negotiations have failed. As documented by Iyer (1994), parliament has not made much use of Entry 56. Various River Authorities have been proposed, but not legislated or established as bodies vested with powers of management. Instead, river boards with only advisory powers have been created. Hence, the state governments dominate the allocation of river waters. Presently, in India many Tribunal Awards are enforced to use water in rivers Krishna, Godavari, Narmada, Ravi-Beas and Cauvery by the adjoining states.

1.2. Narmada Water Disputes Tribunal (NWDT)

In 1965, the Khosla committee planned a 530 feet high dam in Navagam (the present site of the Sardar Sarovar dam) while allocating 13.9 MAF (million acre feet) of water to MP and 10.6 MAF to Gujarat. This proposal was immediately locked in a dispute between the so-called riparian states i.e. Gujarat, Maharashtra and MP over the sharing of the costs and benefits of the project. The then chief minister of MP, Mr. Govind Narayan Singh, objected to the unprecedented submergence as a result of the dam and contested the claims of Gujarat on the Narmada waters. Gujarat on the other hand claimed a higher share of water on the basis of the projected needs of the "drought prone area" in the far-off Kutch region. In this effort, Gujarat also made Rajasthan a party to give itself more bargaining power, although Rajasthan - a non-riparian state - had nothing to do with the project.

Under Section-4 of the Inter-State Water Disputes Act, 1956, the Government of India under Mrs. Indira Gandhi constituted the Narmada Water Disputes Tribunal (NWDT) to resolve this inter-State water dispute on 6th Oct. 1969 to adjudicate upon the sharing of Narmada waters and Narmada River Valley Development under the Chairmanship of Justice V. Ramaswami. The Tribunal gave its Award on 7th Dec., 1979. The NWDT Award was notified by Government of India on 12th December, 1979, whereupon it became final and binding on the parties to the dispute. Also, the decision of the said Tribunal provided for the setting up of the machinery, namely, Narmada Control Authority and a Review Committee for implementing its decisions and directions.

The Award specified 28 MAF (Million Acre Feet) of utilisable waters at 75% dependability to be shared by the four States as under: Madhya Pradesh-18.25 MAF, Gujarat-9.00 MAF, Maharashtra-0.25 MAF and Rajasthan-0.50 MAF; and arrived at the 455 feet for the height of the dam. The requirements at Sardar Sarovar have to be met by releases by Madhya Pradesh and by inflows from the intermediate catchment, surplus to the requirements of Madhya Pradesh below Narmada Sagar and Maharashtra. The releases from Maheshwar work out to 10015.86 M.cu.m. (8.12 MAF). Making uniform monthly releases the amount of water to be released by Madhya Pradesh per month would be 834.65 M.cu.m. (0.677 MAF). The actual inflow in the river system, however, would vary from year to year and, therefore, the releases by Madhya Pradesh would also vary. The Tribunal also determined that out of the net power produced at Navagam (Sardar Sarovar Project complex) at Canal Head and River Bed

Power Houses on any day the share of Madhya Pradesh will be 57 percent; Maharashtra's share will be 27 per cent and Gujarat's share will be 16 per cent.

1.3. The Narmada Control Authority

In pursuance of the decision of the Narmada Water Disputes Tribunal under Clause XIV of its final order, the Government of India framed the Narmada Water Scheme, which, inter alia, constituted the Narmada Control Authority (NCA) and Review Committee in 1980 for proper implementation of the decisions and directions of the Tribunal. The Narmada Control Authority started functioning from 20th December, 1980 has been vested with the powers for the implementation of the orders of the tribunal with respect to the storage, apportionment, regulation and control of the Narmada waters, sharing of power benefits from Sardar Sarovar Project (SSP) regulated release of water by Madhya Pradesh, acquisition of land likely to be submerged under the Sardar Sarovar Project by the concerned States, compensation, resettlement and rehabilitation of the oustees, sharing of costs and implementation of the environmental safeguard measures.

The Authority is headed by the Secretary, Ministry of Water Resources, Government of India, as its Chairman, with Secretaries of the Union Ministries of Power, Environment and Forests, Social Justice and Empowerment, Chief Secretaries of the four party States, one Executive Member and three full-time Members appointed by the Central Government, and four part time Engineering Members nominated by the party States, as Members.

1.4. Functions and Duties of Narmada Control Authority

The role of the Authority mainly comprise of overall coordination and direction of the implementation of all the projects including the engineering works, the environmental protection measures and the rehabilitation programme and to ensure the faithful compliance of the terms and conditions stipulated by the Central Government at the time of clearance of the water resources projects. The Authority has charged with the power and duty to do any or all things necessary, sufficient and expedient for the implementation of the Order of the Tribunal with respect to:

- i) the storage, apportionment, regulation and control of the Narmada waters;
- ii) sharing of power benefits from Sardar Sarovar Project;
- iii) regulated releases by Madhya Pradesh;
- iv) acquisition by the concerned States for Sardar Sarovar project of lands and properties likely to be submerged under Sardar Sarovar;
- v) compensation and rehabilitation and settlement of oustees; and
- vi) sharing of costs.

1.5. Objectives of the Study

In this study, the stipulations of the Narmada Water Dispute Tribunal Award and its implementation with respect to the annual water accounting in the Narmada river basin, apportionment of utilizable flow among the four beneficiary States namely, Madhya Pradesh, Gujarat, Maharashtra and Rajasthan and regulation of Sardar Sarovar reservoir during post-monsoon period have been discussed for the water year (i.e., 1st July to 30th June) for the years 2007-08, 2008-09 and 2009-10. The relevant provisions of NWDT Award dealing the above issues can be summarised as below:

- Clause II - Determination of the Utilisable Quantum of Narmada Waters
- Clause III - Apportionment of the Utilizable Quantum of Narmada Waters
- Clause IV - Order with Regard to Excess Waters and Sharing of Distress
- Clause IX - Regulated Releases to be made by Madhya Pradesh for the Requirement of Sardar Sarovar Project

2. STUDY AREA: THE NARMADA RIVER BASIN

The Narmada is the longest west flowing river in India. It rises from a spring at a height of 1057m above MSL on the summit of Amarkantak Hill in Shahdol district of Madhya Pradesh in the Maikal hill range. The Narmada basin lies between 72° 32' to 81° 45' east longitudes and 21°20' to 23°45' north

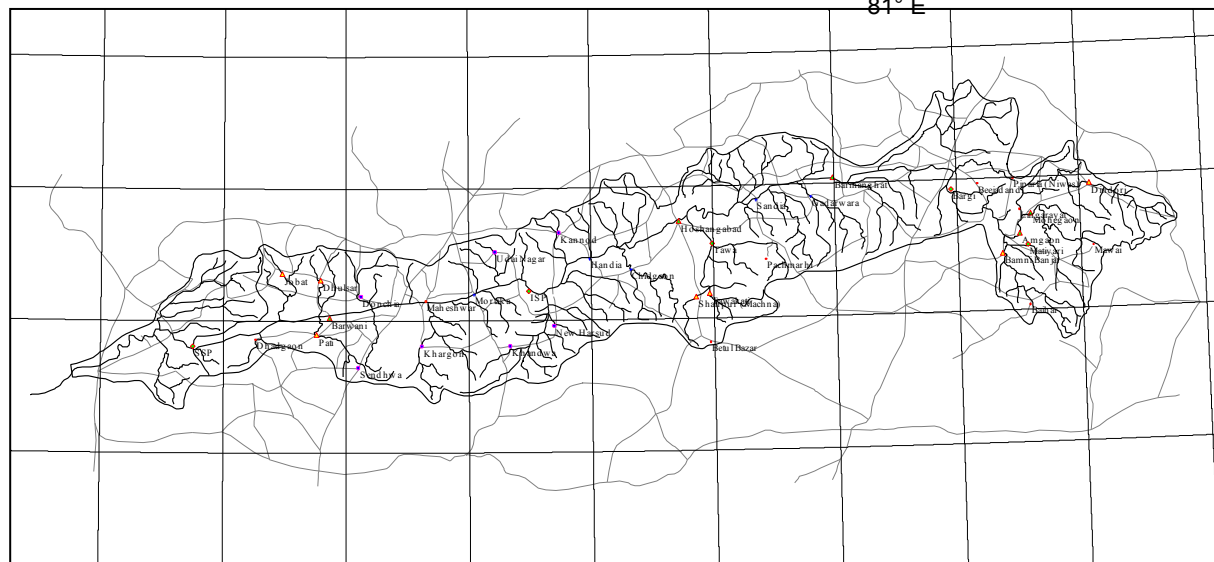


Figure 1: Base map showing Narmada river basin with drainage network

2.1. Major Projects and Canal Systems in Narmada Basin

According to current plans, the Narmada basin will have 30 big dams, 135 medium dams and 3000 small dams on the river Narmada & its tributaries to utilise 28 MAF water. Among these two are megaprojects, one megadam in Madhya Pradesh, i.e. Narmada Sagar Project (Now Indira Sagar Project, ISP) is completed and other megadam in Gujarat, i.e. Sardar Sarovar Project (SSP) is under construction. Till now, Madhya Pradesh has completed ten major projects namely Matiyari, Bargi, Kolar, Tawa, Barna, Omkareshwar, Sukta, Upper Beda, Maan and Jobat; and the works in Maheshwar and Lower Goi projects are at completion stage.

The works on canal systems of major projects, i.e. Matiyari, Kolar, Tawa, Barna, Sukta, Maan and Jobat are completed and works on the canal systems of Bargi, Indira Sagar, Omkareshwar, Lower Goi, Upper Beda and Sardar Sarovar Projects are in progress, however irrigation supplies have been already stated in the developed command area of these projects. About 20 medium projects in Madhya Pradesh have also been completed and many more major, medium and minor projects are yet to take place. The Narmada Canal system of Sardar Sarovar Project is one of the largest canal network for irrigation. The Main canal including 458.318 km long in Gujarat portion and 74.0 km long in Rajasthan portion have been completed in 2008. The canal is designed to carry a maximum discharge of 40000 cusec with Full Supply Depth (FSD) of 7.6 m at Head Regulator (HR). The Canal system would cover a Gross Command Area (GCA) of 34.3 Lakh ha and CCA of 18.419 Lakh ha. It envisages annual irrigation of 17.92 Lakh ha of cultivable land (NCA, 2010).

3. THE UTILISABLE QUANTUM OF NARMADA WATERS

It has been agreed by the party States and decided by the Tribunal that the utilisable quantum of waters of 75 per cent dependability in the Narmada at Sardar Sarovar Dam Site has been assessed at 28 Million Acre Feet (34,537.44 M.cu.m.). The same figure has been arrived by the Tribunal as under:

75 % dependable flow (virgin flow)	:	27 MAF
Evaporation losses from reservoirs	:	(-) 4 MAF
Regeneration from irrigation uses	:	(+) 2 MAF
From carry over storages	:	(+) 3 MAF
		28 MAF

3.1. Clause III - Apportionment of the Utilizable Quantum of Narmada Waters

- i. The Tribunal hereby orders that out of the utilisable quantum of Narmada waters, (a) Madhya Pradesh is entitled to a share of 18.25 Million Acre Feet (22511.01 M.cu.m.), (b) Gujarat is entitled to a share of 9 Million Acre Feet (11101.32 M.cu.m.), (c) Rajasthan is entitled to a share of 0.5 Million Acre Feet (616.74 M.cu.m.) and (d) Maharashtra is entitled to a share of 0.25 Million Acre Feet (308.37 M.cu.m.);
- ii. Further, it is clarified that the apportionment relates to actual withdrawals and not consumptive use;
- iii. Within its share of water, each party State is free to make such changes in the pattern of water use and in the areas to be benefited within or outside the Narmada basin in its territory as it may consider necessary.

3.2. Clause IV - Order With Regard To Excess Waters and Sharing of Distress

- i. The utilisable flow of Narmada in excess of the 28 Million Acre Feet (34,537.44 M.cu.m.) of utilisable flow in any water year, i.e., from 1st of July to 30th of June of next calendar year is apportioned in the following ratios of allocation i.e., 73 for Madhya Pradesh, 36 for Gujarat, 1 for Maharashtra and 2 for Rajasthan;
- ii. In the event of the available utilisable waters for allocation in any water year from 1st of July to 30th June of the next calendar year falling short of 28 Million Acre Feet (34,537.44 M.cu.m.), the shortage should be shared between the various States in the ratio of 73 for Madhya Pradesh, 36 for Gujarat, 1 for Maharashtra and 2 for Rajasthan.

3.3. Ustream Utilizations

NWDT Award Clause IX prescribes procedures for measuring utilizations as under;

(vi) Utilisation in a water year by each party State shall be figured out on the basis of actual daily discharge at canal head on every major and medium project. For minor works, it shall be on the basis of area irrigated under different crops, the delta for each crop being approved by the Authority. For pumping schemes, drawing directly from the river, its tributaries or reservoirs, whether for irrigation, domestic or industrial use, water drawn shall be reckoned on the basis of the rated capacity of pumps and the number of hours they run. For a cross check, the seasonwise and cropwise area irrigated by each pumping scheme shall also be recorded, and if the figures of water drawn as worked out by the two aforesaid methods differ, the decision of the Authority as regards water drawn shall be final.

(vii) Withdrawals from Sardar Sarovar for Navagam Canal for Gujarat and Rajasthan shall be measured at the head of Navagam Canal. The supply to Rajasthan shall be measured at Gujarat-Rajasthan border. The loss in the canal in carrying the supply for Rajasthan shall be determined by the Authority after the canal has been constructed and shall reckon against the share of Rajasthan. Water let down into the river from Sardar Sarovar through power house turbines shall be measured on the basis of power generated by it and that escaped through the spillway by measurement at the spillway.

(viii) For major and medium projects, water account shall be kept by 10 daily period. For minor schemes water accounts shall be kept by crop seasons, Kharif (July to October) Rabi (November to March) and hot weather (April to June).

(ix) The water use by minor and pumping schemes in any ten daily period may provisionally be taken to be the same as in the corresponding period in the previous year on the basis of average use during the crop period. For final water account, however, it will be determined as in (vi) above.

3.4. Methodology for Computation of Utilizable Flow in Narmada Basin

The utilizable flow as per the provisions of NWDT Award upto Sardar Sarovar Project for a water year i.e., from 1st July to 30th June of next calendar year may be computed by considering the components defined as below (sketch shown in Fig.2):

- a. Total virgin flow = Observed outflow + change in storage in reservoir
+ u/s utilization + evaporation - regeneration
- b. Evaporation losses = By actual observation or assumed as 10% of storage
- c. Regeneration = 10% of irrigation use + 60% of domestic & industrial use
- d. Carryover storage = Live storage available in reservoir as on 1st July
- e. Utilizable flow = Virgin flow – evaporation + regeneration + carryover storage

In actual practice, the water level in the major/medium reservoirs are measured every day, the flow in the river is measured at G&D sites every three hourly during monsoon and on daily basis during post-monsoon periods, the outflow through canal HR or through Power House is measured every hour.

The direct measurement of inflow into reservoir is not possible, therefore mass balance equation has been used for the purpose:

$$\text{Inflow into reservoir} = \text{Outflow} + \text{Change in storage in the reservoir} \quad (1)$$

The change in storage in the reservoir is computed by measuring the water level (elevation) of the reservoir and corresponding capacity through the elevation-area-capacity table. The utilizable flow during any desired period, monthly, seasonal or annual may be computed by replacing the 'virgin flow' at definition 'e' by the R.H.S. of the above definition at 'a':

$$\begin{aligned} \text{Utilizable flow} &= \{\text{Observed outflow} + \text{change in storage} + \text{u/s utilization} + \text{evaporation} - \\ &\quad \text{regeneration}\} - \text{evaporation} + \text{regeneration} + \text{carryover storage} \\ &= \text{Observed outflow} + \text{change in storage} + \text{u/s utilization} + \text{carryover storage} \quad (2) \end{aligned}$$

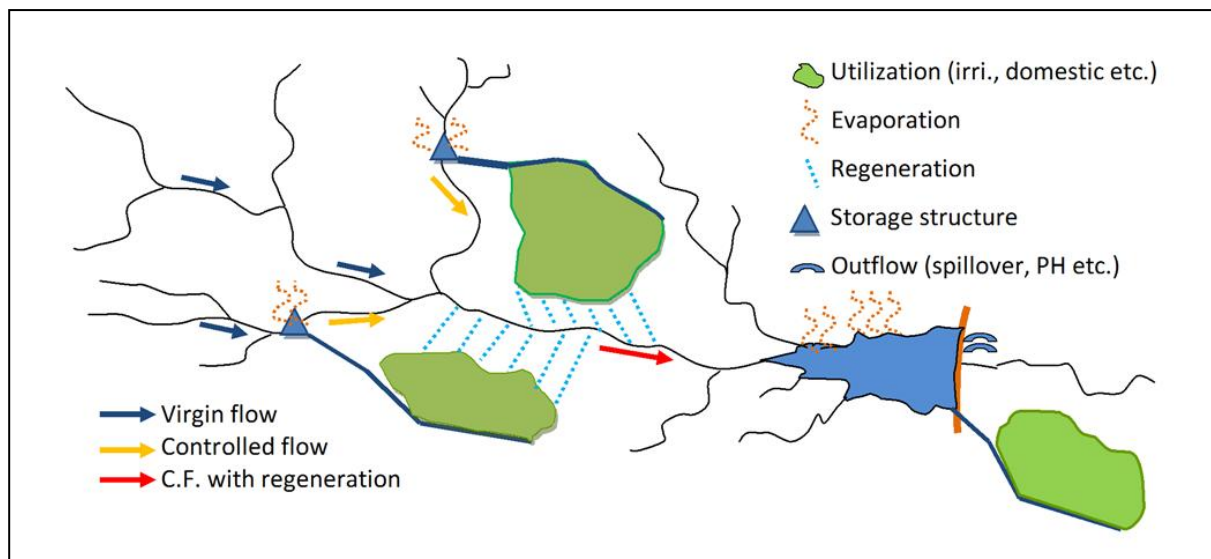


Figure 2: Diagram Showing Components of Utilizable Flow

The observed outflow from the system is flow in case of G&D site as controlling point and water released through P.H., H.R. of canal or direct pumping and Spillways in case of reservoirs. For example, in case of Sardar Sarovar reservoir, the outflow includes releases from the River Bed Power House (RBPH), canal releases from Head Regulator of Narmada Main Canal, industrial supply through pumping and flow through spillway of the dam. The environmental requirement downstream of the Sardar Sarovar dam fulfilled by releasing minimum 600 cusecs flow of water through Godbole weir during the periods when there is no releases through RBPH, however it shall not be reckoned against share of any party State. Change in storage is the difference between the capacity of the reservoir at

the beginning and end of the period under consideration. In case of multiple reservoirs in the upstream of a controlling station, the change in storage and outflows shall be cumulative values for all the reservoirs. The upstream utilizations are submitted by the party States as their respective demands/uses in the beginning/end of the monsoon and post-monsoon periods. The carryover storage is the sum of the quantum of available live storages in all reservoirs at the end of the water year, i.e. as on 1st July at 08.00 hrs.

The basic inputs are obtained on real time basis from CWC/State Govt. for selected locations on Narmada river basin and the releases from projects are given by the project authorities as observed on hourly/daily basis. The Narmada Control Authority has also setup a Real Time Data Acquisition System by installation of 26 remote stations equipped with electronic sensors, automatic recorders and satellite based telemetry system, which transmit hourly rainfall, water level and weather parameters to the Master Control Centre at Indore on real time for further analysis.

4. SARDAR SAROVAR RESERVOIR REGULATION COMMITTEE

In order to ensure proper utilization and allocation of shares of Narmada waters by party States through regulated releases from Indira Sagar Project/ex-Maheshwar for Gujarat, as laid down by the Narmada Water Disputes Tribunal (NWDT), the Authority in its 73rd meeting held on 8th December, 2004 had decided to constitute a Sardar Sarovar Reservoir Regulation Committee for control and operation of Sardar Sarovar Reservoir which inter alia shall also look into the matter related to loss of power due to running of IBPT of SSP keeping in view the decisions of NCA and RCNCA. The Committee has appropriate representation from all the Party States by including the respective Member/Chief Engineer concerned dealing with the subject. The concerned members from the party States have been empowered /authorized to present the views of respective State Governments in regard to implementation of relevant provisions of NWDT Award.

Estimation of utilizable flow in Narmada basin, regulated releases by Madhya Pradesh, utilizations by all the four party States and water releases through Narmada Main Canal at Head Regulator and Gujarat-Rajasthan border are monitored by the Sardar Sarovar Reservoir Regulation Committee (SSRRC) of NCA. The Table-1& 2 shows the final computation of utilizable flow for the water Year 2008-09 and share of the party States on the basis of actual observed flow and utilizations. It is clear that there was shortage of utilizable as compared to the 75% dependable flow by 13.383 MCM. Therefore, the allocations of the Narmada water to the party States have been less than that of their share in the same ratio as stipulated in the NWDT Award.

Table 1: Utilizable Flow for the water year 2008-09 (from 1st July 2008 to 30th June 2009)

Sl. No.	Name of Reservoir	Live Storage as on		Change in Storage	Utilization through HR
		01.07.09	01.07.08		
1	RABLS (Bargi)	141	521	-380	335
2	Tawa Project	90	215	-125	1285
3	Indira Sagar Project	175	-2	177	138
4	Sardar Sarovar Project	472	200	272	4908
	Sub Total	878	934	-56	6666
5	Other Major and Medium Projects	317	110	207	717
6	Minor Schemes upto ISP (Lift)				924
7	Intermediate Catchment Utilization between ISP to SSP (Lift)				1647
8	Outflow from SSP				6882
9	Change in storages of reservoirs				151
10	Carryover Storage in all the reservoirs (as on 01.07.08)				1044
11	Total Utilizable Flow (MCM)				18031
	(MAF)				14.617

Table 2: Share of Utilizable Flow Among the Party States

Sl.No.	Party state	Ratio	MCM	Maf
1	Madhya Pradesh	73/112	11752	9.527
2	Gujarat	36/112	5796	4.698
3	Rajasthan	2/112	322	0.261
4	Maharashtra	1/112	161	0.131
	Total		18031	14.617

SSRRC also estimate the available flow at the end of the monsoon period, i.e. as on 31st October and predict the expected utilizable flow for complete water year. The Table-3 shows the actual flow and utilizations during the monsoon period, i.e. as on 31st Oct. 2009 and expected inflow during post-monsoon period for planning the releases for Rabi water requirements and power generation during the remaining months after meeting the domestic and industrial supplies. Similarly, the method has been applied for mid-term review of utilizable flow and utilizations so far and planning for the remaining months during monsoon and post monsoon periods.

Table 3: Utilizable Flow during the Period from 01.07.09 to 31.10.09 and estimation of utilizable flow for the water year 2009-10

Sr. No.	Name of Project	Live Storage on 01 st July'09	Live Storage on 31st Oct '09	Change in Storage	Utilization Dom./Ind./ Irrigation
1	Bargi	141.3	1632	1490.8	149.6
2	Tawa	89.6	1908	1818.5	18.8
3	Indira Sagar Project	175.0	7278	7103.0	5.2
4	Sardar Sarovar Project	472.0	1113	641.0	2535.9
5	Matiyari	1.4	9.0	7.6	20.7
6	Barna	0.0	449.1	449.1	35.6
7	Kolar	42.0	169.5	127.6	24.4
8	Sukta	21.2	74.4	53.2	0.0
9	Man	0.0	115.0	115.0	4.8
10	Jobat	39.6	66.0	26.4	7.8
	Sub Total	981.8	12814	11832.1	2802.8
11	Medium Projects	12.6	181.9	169.3	22.8
12	Minor schemes (monsoon)				218
	Grand Total	994	12996	12001	3044

Utilizable flow (July-Oct '09) = Carry over storage + Change in storage
+ u/s Utilizations + Outflow from SSP

= 994 + 12001 + 3044 + 6409 =		22448
13	Non-monsoon flow (Base flow and regeneration) \$	1800
14	Minor schemes utilizations (non-monsoon) \$	1800
	\$ Estimated from water year 2008-09 data	
Expected Utilization flow during Water year 2009-10 =		26048
(in Maf) =		21.116

Share of utilizable flow among the party States:

Party state	Madhya Pradesh	Gujarat	Rajasthan	Maharashtra	Total
Ratio	73/112	36/112	2/112	1/112	
MCM	16977	8373	465	233	26048
Maf	13.763	6.787	0.377	0.189	21.116

The Table-4 presents mid-term review of utilizable flow and utilizations for the year 2010-11 after Rabi period (in April) and planning for summer use, specially the releases for Power House during the peaking hours in the summer months after meeting the domestic & industrial demands.

Table 4: Share of utilizable flow among the Party states

Utilizable flow at SSP (upto 31 st March 2011)	=	Carry over storage + Change in storage + u/s Utilization + Outflow from SSP	
	=	1941+3539.8+9583.9+11711	26776
Expected inflow during Apr-Jun'11 @ 2% of the utilizations			429
i.e. (22.05 Maf)		Total (MCM)	27205

Party state	Ratio	MCM	Maf	Utilised so far MCM (Maf)
Madhya Pradesh	73/112	17732	14.37	5795 (4.698)
Gujarat	36/112	8744	7.09	3641 (2.952)
Rajasthan	2/112	486	0.39	148 (0.120)
Maharashtra	1/112	243	0.20	0 (0.000)
		27205	22.05	9584 (7.769)

Two observations worth mention are:

- 1) During overflow period: GoG has drawn 520.71 MCM water against their indent of 175.34 MCM
- 2) 11711 MCM water released through RBPH, Godbole weir & spill over shall not be available for utilisations during the remaining months of the water year 2010-11.

4.1 Issues of Disputes in Water Utilization and Utilizable Flow

Any dispute in respect of utilizable flow and utilizations of Narmada water among the party States are technically resolved at the SSRRC and arrived at an amicable solution in line with the stipulations of NWDT Award and acceptable to all party States, i.e. Madhya Pradesh, Gujarat, Rajasthan and Maharashtra. One such issue on reckoning the releases from Sardar Sarovar reservoir for downstream environmental requirements in the share of Gujarat state was recently resolved by SSRRC. Since the provision of minimum 600 cusecs continuous flow downstream of Sardar Sarovar Project is mandatory for environmental considerations and riparian rights and not as indent from the Govt. of Gujarat, therefore it should not be reckoned against share of any party States and also should not be accounted as part of utilizable flow.

Another issue on “**use of surplus water as per Clause IV(5) of NWDT Award**” has been discussed in light of the stipulations given in the NWDT Award. Item (5) of Clause IV (page 141-142) of the Final Order and Decision of the Narmada Water Disputes Tribunal Award, Volume II, 1979 stipulates that: *“It may be mentioned that in many years there will be surplus water in the filling period after meeting the storage requirements and withdrawals during the period. This will flow down to sea. Only a portion of it will be utilisable for generating power at Sardar Sarovar River-Bed Power-House and the rest will go waste. It is desirable that water which would go waste without even generating power at the last River-Bed Power-House, should be allowed to be utilised by the party States to the extent they can. Gujarat is, therefore, directed that whenever water starts going waste to sea without generating power, or based on the information received from upstream gauging stations, it anticipates that water would so go waste, it shall inform the Narmada Control Authority (hereinafter referred to as the Authority) and designated representatives of all the concerned States. Gujarat shall also inform them when such flows cease. During the period of such flows, the party States, whose reservoirs are spilling and the spill water cannot be stored elsewhere, may utilise such flows from the said reservoirs as they like and such utilisation by the party States will not count towards allotment of supplies to them, but, use of such water will not establish any prescriptive rights.”*

The matter was discussed in the XVI meeting of SSRRC held on 7th September, 2009 at Bhopal and subsequently the nomination of the officers suggested by the Party States was endorsed by Narmada Control Authority in its 82nd meeting held in New Delhi on 20th June, 2010. The committee therefore directed that whenever water starts going waste to sea, without generating power, Gujarat shall inform the Narmada Control Authority with copies to designated representatives of all the concerned States, and Gujarat shall also inform them when such flows cease. During the period of such flows, the party States may utilize water as they like and such utilization by the party States will not count towards allotment of supplies to them, but use of such water will not establish any presumptive right. In follow-up, the Govt. of Gujarat had requested for nominations from the party States and they are informed through email, fax and by post the time of start/stop of overflow from Sardar Sarovar reservoir, during which the water used by the party States in excess of the indented quantity are not reckoned against their share.

DISCLAIMER

The views expressed in this article are the author's and not necessarily those of the Narmada Control Authority and the National Institute of Hydrology. The Narmada Control Authority and the National Institute of Hydrology will not be legally responsible in contract, tort or otherwise for any statement made in this publication.

REFERENCES

- Ramana, M.V.V., (1992): Inter- State River Water Disputes in India, Orient Longman Private Limited, Madras.
- Richards, A. and Singh, N., (2002): Inter State Water Disputes in India: Institutions and Policies, International Journal of Water Resources Development, 18 (4), 611-625.
- Mohan, S.N., Sashikumar, N., Sailen Routray, Sreeja, K.G., (2007): National Dialogue to Review and Evolve Parameters for Interstate Water Sharing in India, Report of National Institute of Advanced Studies, Indian Institute of Science Campus, Bangalore, India.
- Iyer, R.R., (1994): Indian Federalism and Water Resources, International Journal of Water Resources Development, 10 (2), 191-202.
- CWC, (2006): Integrated Hydrological Data Book (Non-Classified River Basins), Information Systems Organisation, Central Water Commission, New Delhi.
- Banerjee, R., (2009): Water Governance in the Narmada River Basin, Water Governance Project Review Paper, Society for Promotion of Wastelands Development.
- NCA, (2008): Annual Water Account of Narmada River Basin for Water Year 2007-08, Narmada Control Authority, Indore.
- NCA, (2009): Annual Water Account of Narmada River Basin for Water Year 2008-09, Narmada Control Authority, Indore.
- NCA, (2010): Annual Water Account of Narmada River Basin for Water Year 2009-10, Narmada Control Authority, Indore.
- NCA, (2010): Status Report of Narmada Main Canal of Sardar Sarovar Project ending September, 2010, Narmada Control Authority, Indore.