State's Water Resources: An Overview

Odisha depends largely upon monsoon for its water resources. Southwest monsoon triggers rainfall in the state. About 78% of total annual rainfall occurs during the period from June to September and the balance 22% in the remaining period from October to May. In addition to seasonal availability, the rainfall in the state also shows spatial variation i.e. from about 1200 mm in southern coastal plain to about 1700 mm in northern plateau. The long-term average annual rainfall in the state is of the order of 1452 mm, which corresponds to an annual precipitation of about 230.76 billion cubic metres (BCM) of water. Of the total precipitation, a part is lost by evaporation & transpiration, a part goes towards increasing ground water storage and the remaining appears as surface runoff. The groundwater reserve and surface runoff constitute the water resources of the state.

Surface Water Resources

The state is endowed with an extensive network of rivers and streams. As per an assessment made in 2001, the average annual availability of surface water from states own drainage boundary is estimated as 82.841 BCM. Considering the topography and geological limitations, it has been assessed that 65.679 BCM of water can be utilised. Besides, inflow of 37.556 BCM is also available annually from neighbouring states through interstate rivers. Out of which, the utilisable surface water resources is assesed as 29.861 BCM. Due to increasing demands of water for various uses, an attempt has been made to assess the availability of water by the year 2051. The assessment reveals that the surface water availability from its own drainage boundary remains more or less fixed but the inflow of surface water from neighbouring states will be reduced from 37.556 BCM to 25.272 BCM. The following table shows the assessed inflow of surface water pertaining to the years 2001 & 2051.

Table - 2.1 Basinewise availability of Surface Water (Scenario: 2001)

Basin Name	Average Annual flow (in BCM)			75% dependable flow (in BCM)		
	Own	Outside State	Total	Own	Outside State	Total
Mahanadi	29.90	29.255	59.155	25.508	23.225	48.732
Brahmani	11.391	7.186	18.577	8.849	5.521	14.011
Baitarani	7.568	-	7.568	5.434	-	5.434
Rushikulya	3.949	-	3.949	2.782	-	2.782
Vamsadhara	5.083	-	5.083	3.881	-	3.881
Budhabalanga	3.111	-	3.111	2.521	-	2.521
Kolab	11.089	-	11.089	8.885	-	8.885
Indravati	6.265	-	6.265	4.451	-	4.451
Bahuda	0.438	-	0.438	0.213	-	0.213
Nagavali	2.853	-	2.853	2.322	-	2.322
Subernarekha	1.193	1.115	2.308	1.193	1.115	2.308
Total	**82.841**	**37.556**	**120.397**	**65.679**	**29.861**	**95.540**

Table - 2.2
Basinwise availability of Surface Water (Future Scenario: 2051)

Basin Name	Average Annual flow (in BCM)			75% dependable flow (in BCM)		
	Own	Outside State	Total	Own	Outside State	Total
Mahanadi	29.90	21.039	50.939	25.508	16.702	42.210
Brahmani	11.391	3.118	14.509	8.849	2.395	10.884
Baitarani	7.568	-	7.568	5.434	-	5.434
Rushikulya	3.949	-	3.949	2.782	-	2.782
Vamsadhara	5.083	-	5.083	3.881	-	3.881
Budhabalanga	3.111	-	3.111	2.521	-	2.521
Kolab	11.089	-	11.089	8.885	-	8.885
Indravati	6.265	-	6.265	4.451	-	4.451
Bahuda	0.438	-	0.438	0.213	-	0.213
Nagavali	2.853	-	2.853	2.322	-	2.322
Subernarekha	1.193	1.115	2.308	1.193	1.115	2.308
Total	**82.841**	**25.272**	**108.113**	**65.679**	**20.212**	**85.891**

Source - State Water Plan

Water Storage

A storage capacity of 17.00 BCM has so far been developed through completed major, medium and minor(flow) projects. Besides, the projects under construction will contribute to an additional 1.77 BCM. The details are given in the following table.

Table - 2.3 Storage capacity of Reservoirs (Qty. in BCM)

Category	Completed Projects		Projects under construction	
	No	Capacity	No	Capacity
Major	7	14.86	4	1.36
Medium	38	1.53	9	0.41
Minor	2340	0.85	-	-
Total	**2385**	**17.24**	**13**	**1.77**

Ground Water Resources

The natural recharge of ground water takes place through percolation from land after rain events. The quantum of dynamic ground water, which can be annually extracted, is generally reckoned as ground water potential. The ground water resources assessment are being carried out at an interval of five years following on the norms and methodology prescribed by the Ground Water Estimation Comittee (GEC) of Government of India.

As per the latest assessment, the State has net dynamic ground water resources of 16.69 lakh ha.m (BCM). Out of which, exploration to the extent of 5.02 lakh ha.m (BCM) has been made for various uses. Basinwise ground water resources & its utilisation is given in the following table.

Table - 2.4
Ground Water Resources and Sectoral utilisation

Sl. No.	Basin	GW Resources (HM)	Sectoral GW Draft in Basin as of March 2013				Stage of GW Development (%)
			Irrigation (HM)	Domestic (HM)	Industrial (HM)	Total Draft (HM)	
A.	**River Basin**						
1	Bahuda	11023	3090	571	-	3661	33.21
2	Baitarani	167215	59275	5675	2147	67097	40.13
3	Bansadhara	72402	13102	2225	8	15335	21.18
4	Brahmani	198033	52686	9061	2483	64230	32.43
5	Budhabalanga	83957	27302	3263	1412	31977	38.09
6	Indravati	55912	6153	3136	20	9309	16.65
7	Jambhira	38634	16705	1378	-	18083	46.81
8	Kolab	75343	6673	2585	-	9258	12.29
9	Mahanadi	685477	152628	37254	2262	192144	28.03
10	Nagabali	26167	3109	1336	49	4494	17.17
11	Rushikulya	117910	28068	6275	484	34827	29.54
12	Subernarekha	59855	19303	2123	-	21426	35.80
B	**Area draining dir**	**ectly to sea**					
13	Chilika	27372	4460	1254	37	5751	21.01
14	Kansabansa	49614	22034	1565	711	24310	49.00
State Total		**16,68,914**	**4,14,588**	**77,701**	**9,613**	**5,01,902**	**30.07**

G.W.- Ground Water, HM- Hectare Metre

Planning, Development & Management of State's Water Resources

Competing demands on water resources from industrial, domestic, environmental and other sectors essentially warrants an integrated water resources development and management approach. The river basin is taken as a logical hydrological unit of management. To achieve this objective, policy initiatives, administrative initiative and legal provisions have been made at the state and national levels. Some of the initiatives taken in our state include the following ones.

Policy Framework

State Water Policy

The state formulated its first State Water Policy in 1994 following the principle enunciated in the National Water Policy 1987. Thereafter, a number of developments have taken place; new information and knowledge have been generated and new issues and challenges have emerged in the field of development and management of water resources. It was therefore felt necessary by the State Government to review the State Water Policy, 1994. After due consideration, the State Government have prepared Water Policy called "Odisha State Water Policy-2007". Following order of priority in water allocation has been made in State Water Policy-2007. (1) Drinking Water and domestic use (2) Ecology (3) Irrigation, Agriculture and other related activities including fisheries (4) Hydropower (5) Industries including Agro Industries (6) Navigation and other uses such as Tourism.

Meanwhile, Government of India revised the Water Policy and brought out National Water Policy 2012. National Water Policy 2012 underscores the need for revision of State Water Policy in accordance with this policy keeping in order the basic concerns and principles as also a unified national perspective. Considering this, department has taken initiative for revision of State Water Policy.

Institutional Framework

(A) State Planning Board

A key organization of State Government, the Board provides policy direction in formulating plan scenario and both short term and long term development objectives. The Board has a member for Water Resources Development of the State.

(B) Water Resources Board

Government of Odisha constituted the Water Resources Board, the apex body in water sector with Chief Secretary of the state as Chairman and Development Commissioner as Vice-Chairman. Agriculture Production Commissioner, Secretaries of various departments viz. Water Resources, Rural Development, Forest and Environment, Housing & Urban Development, Agriculture, Energy, Finance, Revenue & Disaster Management are members. Engineer-in-Chief, Planning & Designs of Department of Water Resources is the member Secretary of Board. Besides, Engineer-in-Chief (Water Resources), Chief Engineer (Minor Irrigation), Chief Engineer (PP&F), Director (WALMI), Director (Technical, OLIC), Director (Hydrology & Water Planning), Chairman (State Polution Control Board) are also members. The Board is the highest forum to ensure interdepartmental co-ordination and is involved in water planning and development processes such as formulation of State water policy, integrated planning of water resources, allocation of water resources to various water use sectors, prioritization of water resources development, environment management plan, etc.

(C) Department of Water Resources

The Department is responsible for planning, developing and managing the State's water resources for irrigation, bulk water supply, flood control and drainage along with implementation of Major, Medium, Minor irrigation projects and their operation and maintenance.

Legal Framework

(A) Odisha Irrigation Act and Rule

The Odisha Irrigation Act came into force in 1959 and the Odisha Irrigation Rules in 1961. The Act covers the legal aspects related to construction and maintenance of irrigation works. It also prescribes the basic water rates to be made applicable to various class of irrigation systems for which water is to be supplied. The act was amended in the year 1998 to accomodate regulation of use, diversion, consumption of water for industrial and commercial purposes other than agriculture. The Odisha irrigation rules were ammended time to time depending upon the requirement.

(B) Odisha Pani Panchayat Act & Rule

The primary objective of this Act is to ensure optimum utilization of water by farmers for improving agricultural production, to involve farmers' organizations in the management and maintenance of the irrigation system to ensure dependable supply and distribution of water. The Pani Panchayat Rule provides guidelines for formation, membership, duties and responsibilities of Water Users' Associations.