



IWRM Plan on District Level



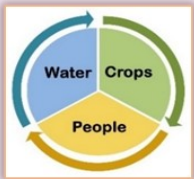
A project supported by Ministry of Water Resources, RD & GR, Govt. of India

Implementing Organization : National Institute of Hydrology, Roorkee
(An Autonomous organization under Ministry of Water Resources, RD&GR, Govt. of India)

Partner Organizations : Remote Sensing Applications Centre-UP, Lucknow
(An Autonomous organization under the Department of Science & Technology, Govt. of U.P.)
M.P. Council of Science & Technology, Bhopal
(An Autonomous Organization of Govt. of M.P.)

About the Project

This project **"IWRM Based Development Plan for Water Security in Four Districts of Bundelkhand Region in India"** is an effort to conduct a rapid assessment of the status of water management in the selected watersheds of four districts of Bundelkhand region —two districts each in Uttar Pradesh (Jhansi and Lalitpur) and Madhya Pradesh (Chhattarpur and Tikamgarh) , and to develop an IWRM Plan for introducing an integrated approach of water management linked with the concept of livelihood, in the identified watersheds within the four districts.



What is an IWRM Plan?

A process of promoting coordinated development and management of **water, land** and related resources to sustainably maximize the **economic and social welfare** (GWP, 2000). The IWRM Plan designed provides suggestions on the activities under three themes :

(1) Water management, (2) Land management, and (3) Livelihood management

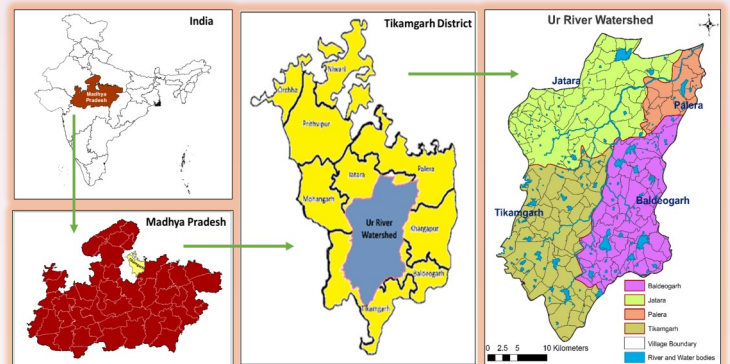
Study Area

Ur River watershed is situated in Tikamgarh district of Madhya Pradesh and lies on the Bundelkhand Plateau between the Jamni, a tributary of the Betwa and the Dhasan rivers. The total geographical area of the watershed is 990.61 sq. km. The watershed covers parts of four administrative blocks of Tikamgarh district viz., Tikamgarh, Baldeogarh, Jatara and Palera. The average annual rainfall received in the district is around 1100 mm.



Issues faced by the region

- Semi-arid region — drought prone area
- Variable climate condition — irregular rainfall
- Geological disadvantage – underground granite formation limits groundwater recharge
- Failure in agriculture has become a cyclical phenomenon
- Socio-economically backward — Reports of hunger, starvation deaths, large-scale migration, suicides related to extreme economic stress and indebtedness



Water Balance

The quantification of the vital hydrological components, using water balance eq., is critical for understanding the overall hydrological regime and water availability scenario. The water balance computation suggests appropriate measures should be initiated to arrest the surface runoff for multiple uses– domestic, agriculture, industry.

The water budget of the Ur watershed was carried out on a seasonal time scale for two seasons - monsoon season (Jun- Oct) and non-monsoon season (Nov -May). The water budget during the monsoon season yields an estimate of the major components and also helps to identify those components which can be utilized more effectively to conserve the precious water resources .

Water budget during normal rainfall year (2008-09)			
Water balance components	Monsoon (MCM)		Non-monsoon (MCM)
	Inflows		
Rainfall	1195.75	28.09	
Groundwater inflow	10.07	13.55	
Outflows			
Domestic demands	6.759	9.365	
Livestock demands	1.896	2.627	
Agriculture demands	28.33	134.83	
Surface runoff	333.02	0.00	
Forested areas	126.58	149.64	
Evaporation from tanks	1.36	2.13	
Groundwater outflow	10.856	14.839	
Change in Storage			
Change in Storage (GW)	344.53	-319.85	
Change in Storage (SW)	69.28	-67.34	
Unaccounted water	283.22	115.39	
Percentage Error	23.69	9.43	

IWRM Plan for Ur Watershed, Tikamgarh District, MP

Water Management

Water Quality

1. Surface Water Quality

- Surveyed 15 ponds in 2015
- Estimated Water Quality Index using National Sanitation Foundation (NSF) Method
- Determined the suitability for Fishing, Irrigation, Drinking



2. Ground Water Quality

- Surveyed 32 samples in 2014 and 45 samples in 2016
- Estimated Water Quality Index using Weighted Arithmetic Index Method
- Determined suitability for human consumption



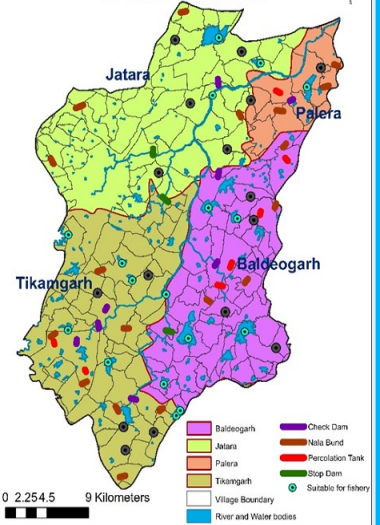
Water Quantity

Enhancing water availability by suggesting locations for water harvesting/ storage structures following the IMSD guidelines:

- Farm Ponds
- Check Dams
- Storage Dams
- Stop Dams
- Nala Bund
- Percolation Tanks
- Roof water harvesting



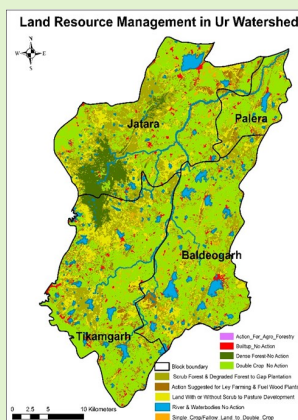
Water Harvesting Structures in Ur River Watershed



Land Management

Crop Management

- Efficient irrigation techniques
 - * System of Rice Intensification,
 - System of Wheat Intensification,
 - System of Crop Intensification drip irrigation etc.
- WADI (agri-horti model based)
- Line sowing
- Crop diversification
- Crop rotation



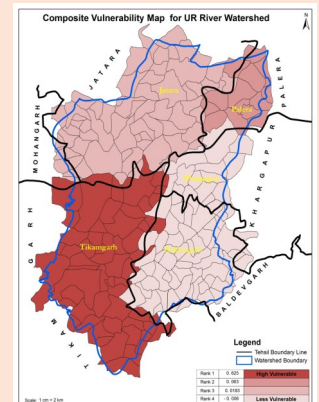
Land Resource Management

Suggestions regarding land use and agricultural pattern to enhance productivity and maintain soil health

Livelihood Management

Carried out Livelihood Vulnerability Assessment due to climate change

- Calculated Livelihood Vulnerability Index using IPCC Approach
- Identified most sensitive livelihood and stresses
- Suggested adaptive strategies to cope up with climate change



The IWRM Plan will be handed over to the respective District Collectors for implementation through the District Irrigation Plan / District Agricultural Plan.

About National Institute of Hydrology

National Institute of Hydrology (NIH) is a premier Research and Development organization under the MoWR, RD & GR, Government of India. It was established as an autonomous society in 1978 with its headquarters at Roorkee. The main objectives of NIH are to undertake, aid, promote and coordinate systematic and scientific work in all aspects of hydrology.

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