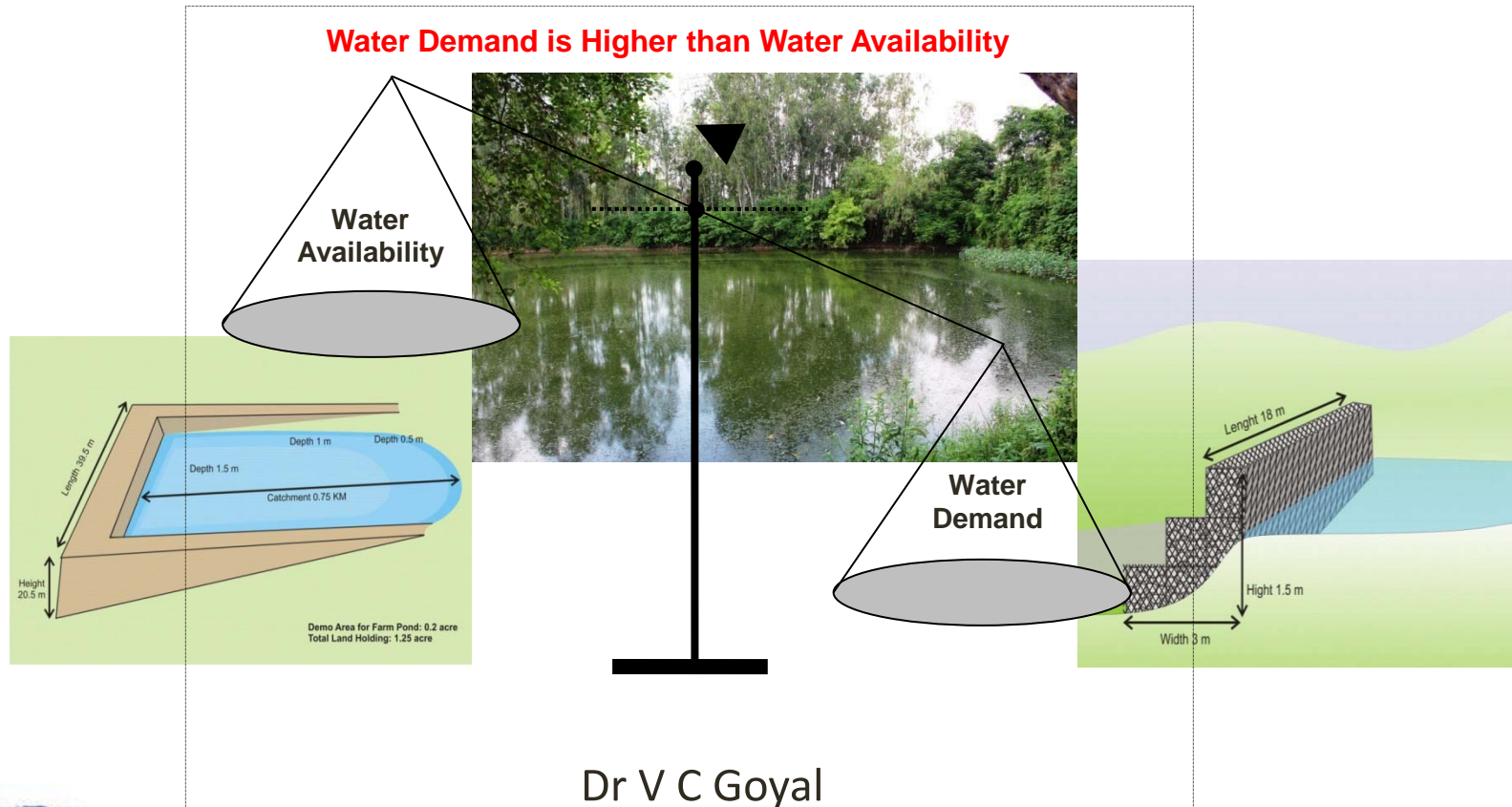


“Local IWRM” & Practical Approaches



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Objectives of Water Management

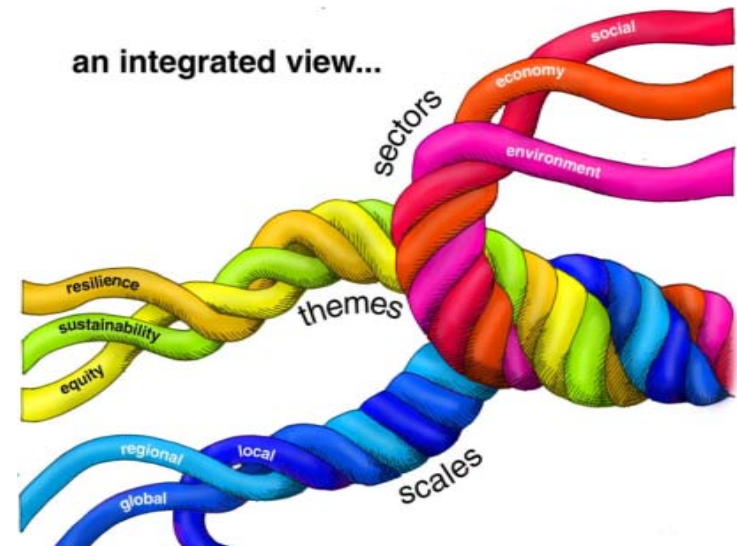
- Efficient and gainful utilization of water and other natural resources
- Healthy living for human and cattle resources
- Livelihood options for all
- Preparedness for disasters/calamities

Integrated Water Resources Management (IWRM)

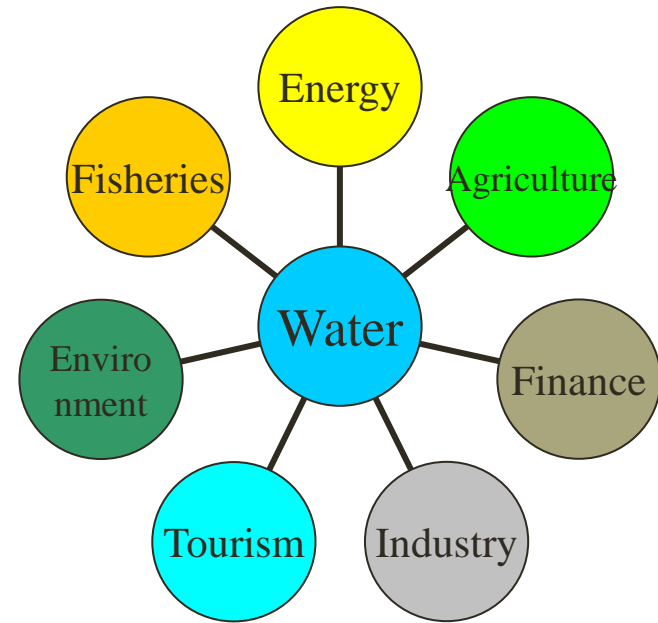
“is a process that promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems”

(Global Water Partnership)

- More coordinated development and management of:
 - Land and water
 - Surface water and ground water
 - Upstream and downstream interests



Integrating across scales and sectors

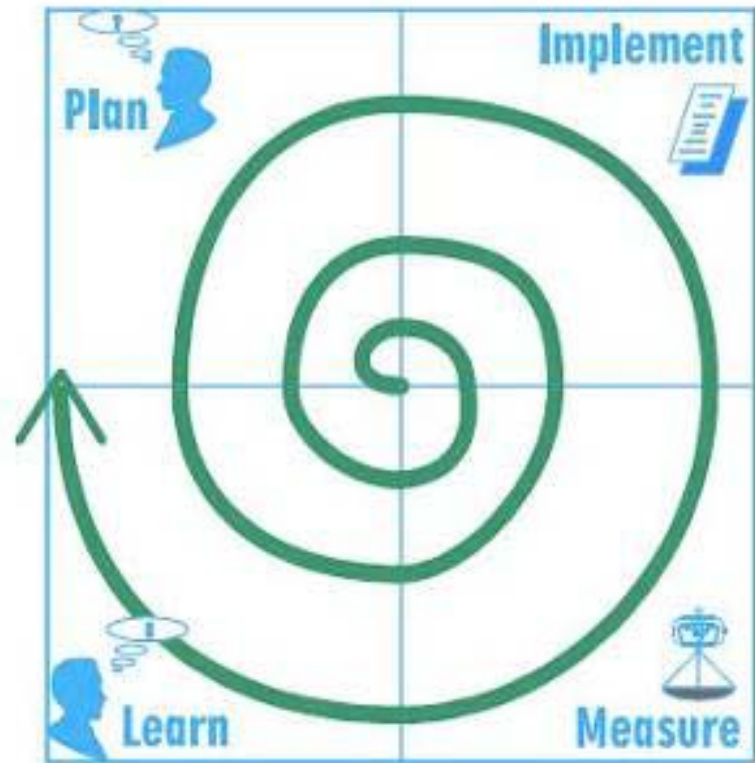


Putting IWRM into practice

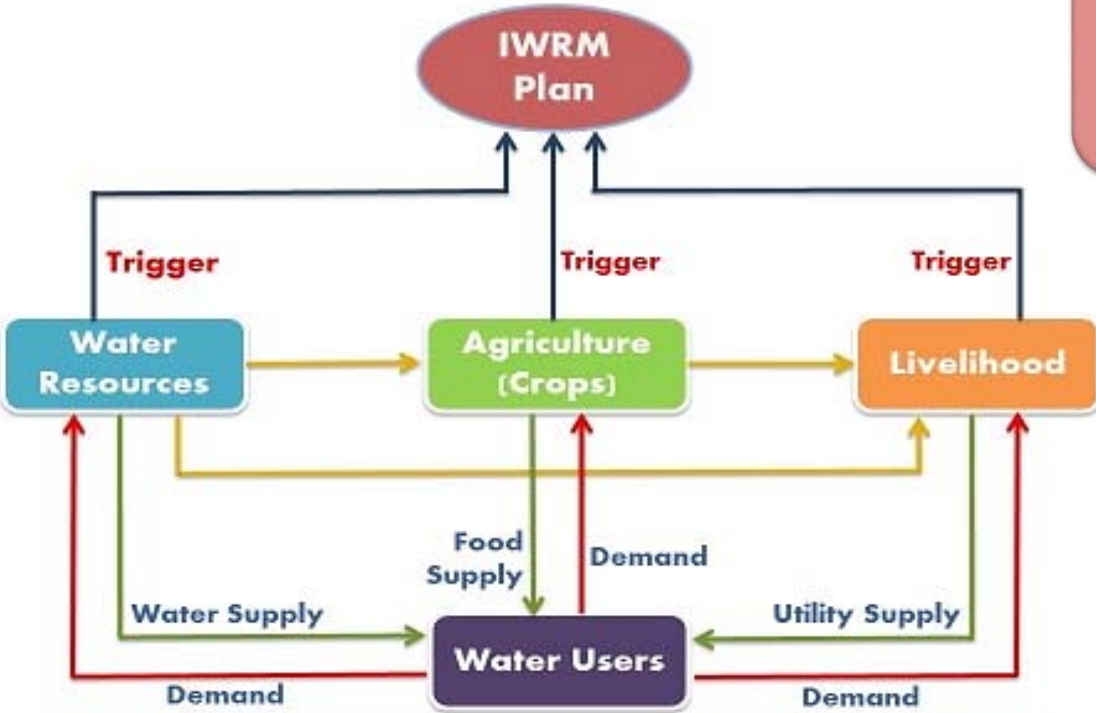
IWRM is not a fixed prescription but an iterative process

This means that the specific form IWRM takes will vary from country to country and from region to region.

It also means that **IWRM is an inherently adaptive approach – one that can accommodate emerging challenges, local constraints and changing social priorities.**



What IWRM Deals with?



IWRM: Action Research Activities

- Water budgeting
- Water demand and availability: gap estimation
- Water allocation planning for different uses
- Water quality assessment
- Wastewater management planning
- Protection and rejuvenation of water bodies (e.g. ponds, lakes)
- Water harvesting measures: identification of suitable sites and appropriate structures
- Groundwater recharge measures
- Crop planning: soil health assessment; water-efficient crops; efficient cropping practices (e.g. SRI)
- Field demonstrations
- Income optimization scenarios
- Capacity building of stakeholders

IWRM Plan at District Level?

- All federal and State government funding is available at districts
- District is the administrative unit where implementation is planned
- “Integration” is best possible at district level (DC/DM is the single authority)
- Conflicts are less/avoidable
- Identified needs are better addressed according to availability of resources
- Institutional frameworks and management instruments are feasible
- Stakeholders’ participation is feasible
- “Local/light” IWRM can be adapted as per felt needs
- Upscaling to basin level or downscaling to village government level is possible & feasible

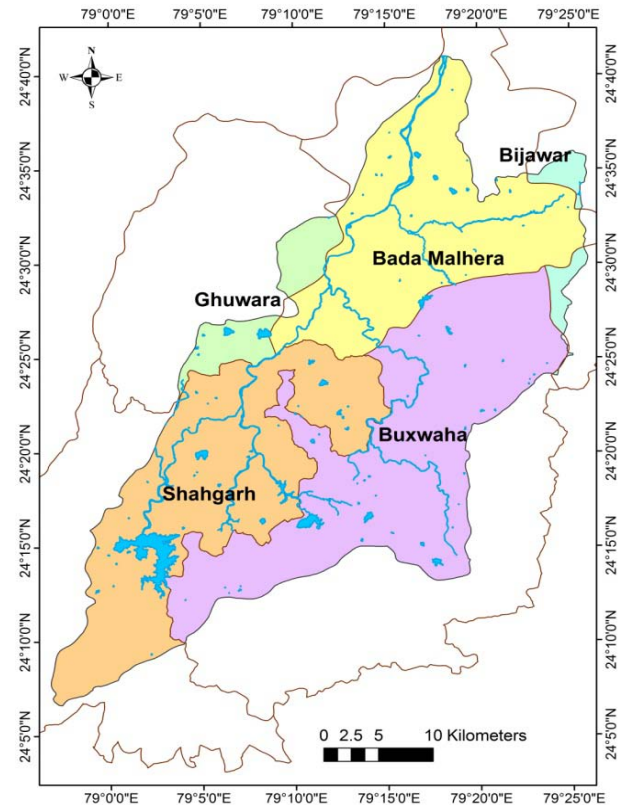
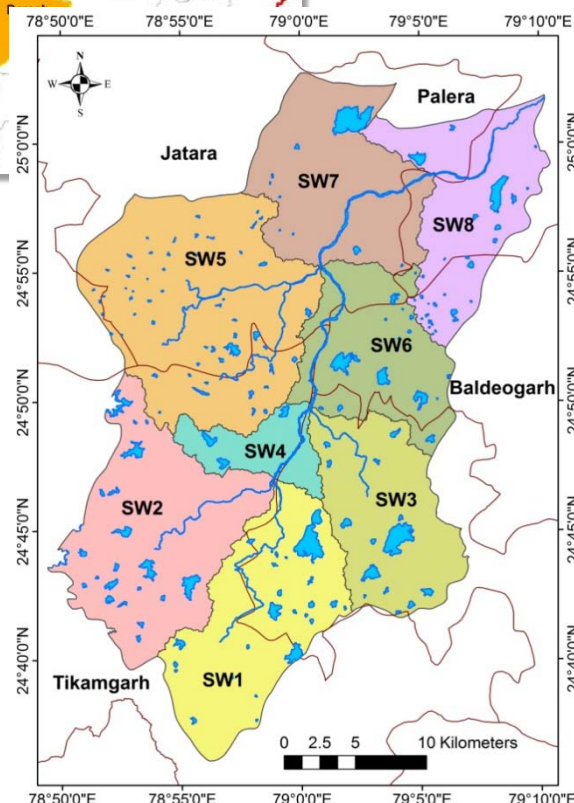
Aligned to the District Irrigation Plan (DIP), with specific inputs to DIP

Stages of IWRM Plan (IP) Development

1. Stakeholders' consultation-1: identification of needs
2. Development of IP modules by GIS/IT professionals
3. Creation of database (thru secondary sources and field surveys)
4. Data analysis & interpretation by specialists
5. Field verification of suitable WH sites & structures
6. Pilot field demonstrations of BMPs
7. Documentation
8. Stakeholders' consultation-2: Draft IP is shared & suggestions obtained
9. Capacity building and awareness creation activities
10. Stakeholders' consultation-3: Handover of IP to district authorities
11. Handholding of district authorities for IP implementation

A Case Study from Bundelkhand

Study watersheds in Bundelkhand, India

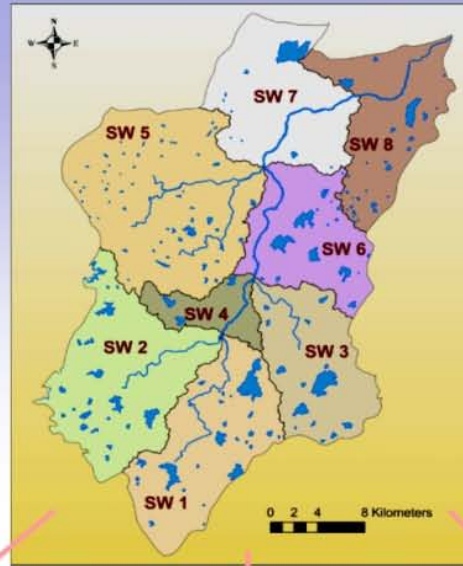


IWRM Plan for Ur River Watershed

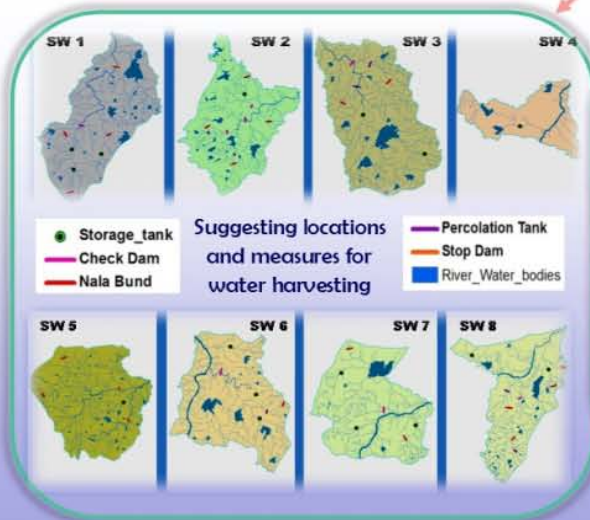
IWRM Plan for Ur River watershed in Tikamgarh district of Madhya Pradesh

Integrated Water Resources Management PLAN

A process of promoting coordinated development and management of water, land and related resources to sustainably maximize the economic and social welfare

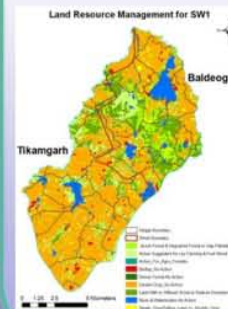


1. Water Management



2. Land Management

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



- ◆ Efficient irrigation techniques
 - ◆ Line sowing
 - ◆ Crop diversification
 - ◆ Crop rotation
- SWI, SRI, SCI, WADI (agri-horti model based), drip irrigation etc.

3. Livelihood Management

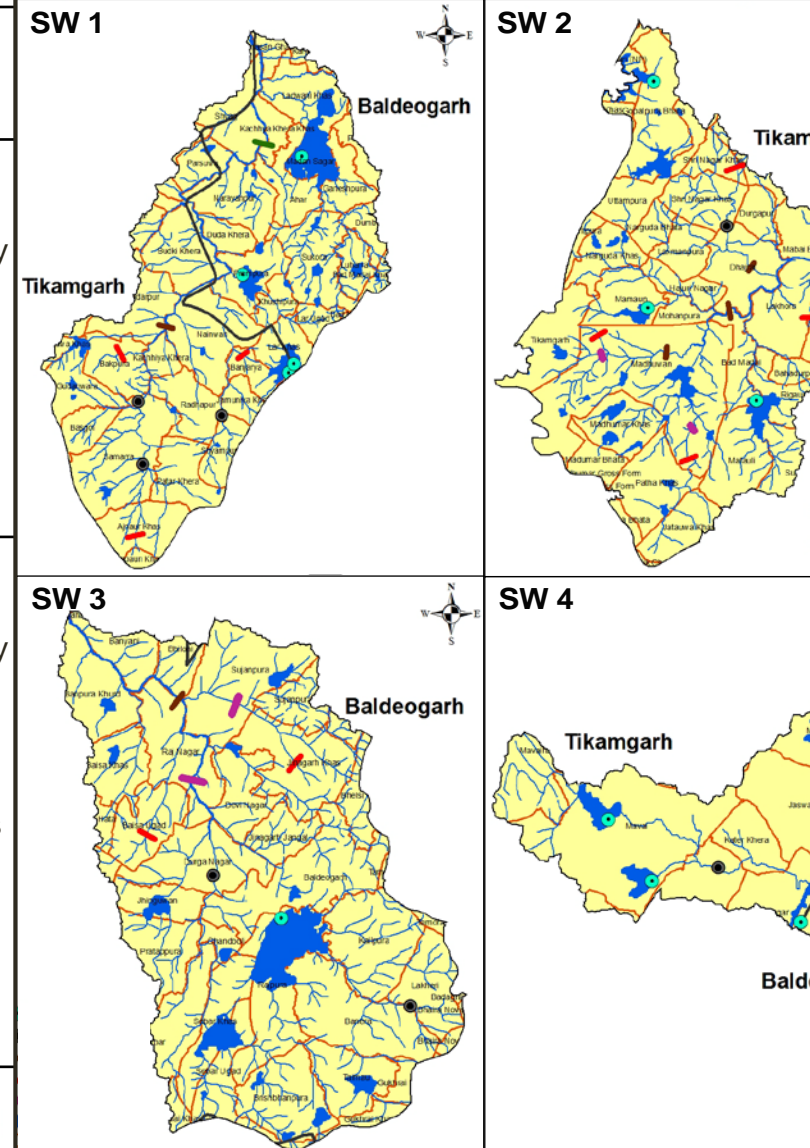
Identification of the most vulnerable areas and suggesting measures to improve their livelihood

- Promoting Wadi farming through capacity building programs
- Promoting off-farm and non-farm occupations (eg. Poultry farming, pisciculture, bee keeping, handicrafts etc.)
- Raising awareness on climate change

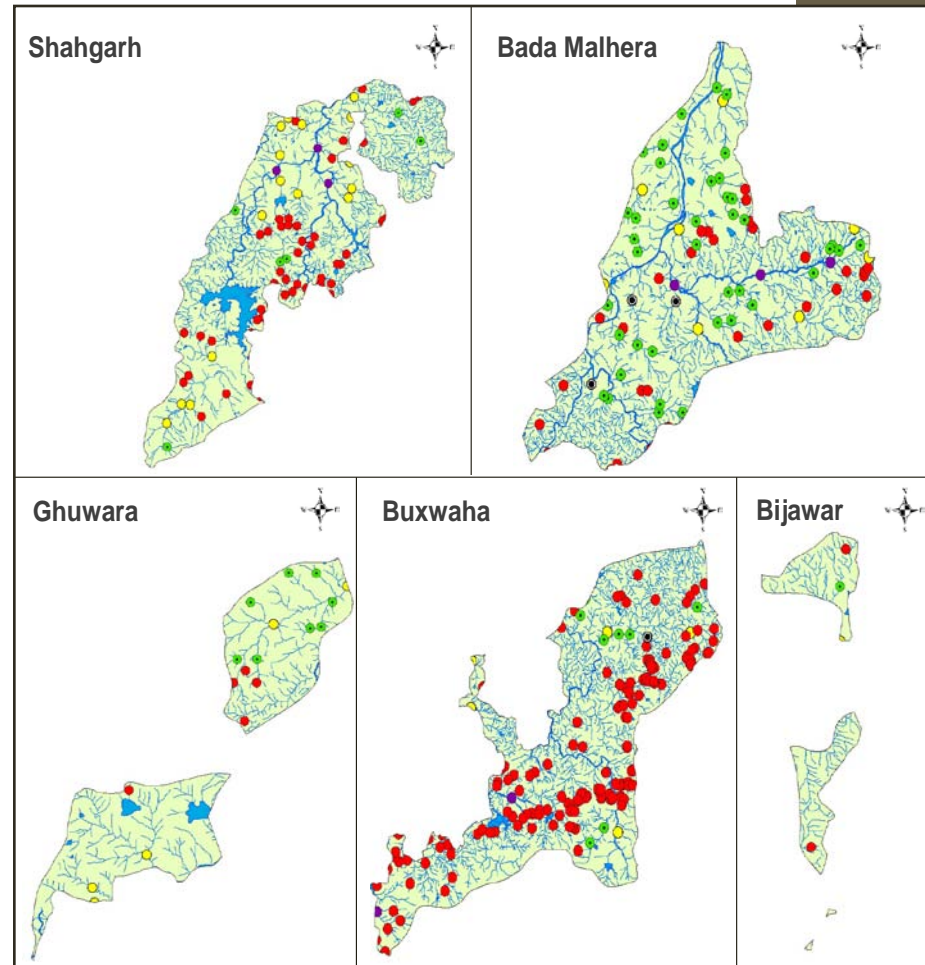


Water Management

Sub-watershed	Domestic/Drinking water demands	Irrigation/Surface water harvesting	Aquifer recharge
SW1	Rooftop rainwater harvesting in all schools, government buildings, hospitals, community centers, and pucca houses	Construction of farm ponds at both individual and community level to support irrigation as well as for surface storage of water Construction of 3 Storage tanks	For groundwater recharge purpose, the following structures may be constructed: 3 Nala bunds 1 Check dam 1 Stop dam
SW2	Rooftop rainwater harvesting for both rural and urban household population. Efficient water distribution system to avoid water loss and wastage Construction of STPs (Sewage Treatment Plants)	Construction of farm ponds in rural area and 1 Storage tank	For groundwater recharge purpose, the following structures may be constructed: 4 Nala bunds 3 Check dams 2 Percolation tanks



Block	Domestic/Drinking water demands	Irrigation/Surface water harvesting	Aquifer recharge
Shahgarh	Rooftop rainwater harvesting Efficient water distribution system to avoid water loss and wastage Construction of STPs (Sewage Treatment Plants)	Construction of 6 Farm Ponds at both individual and community level to support irrigation as well as for surface storage of water	For groundwater recharge purpose, 42 Gabion Structures 16 Percolation Tanks and 3 Check Dams may be constructed. Injection wells to recharge the aquifers through filter-pit design
Bada Malhera	Rooftop rainwater harvesting Efficient water distribution system to avoid water loss and wastage Construction of STPs (Sewage Treatment Plants)	Construction of 40 farm ponds and 4 storage tanks to support surface water harvesting	For groundwater recharge purpose, 26 Gabion Structures 7 Percolation Tanks and 3 Check Dams may be constructed. Injection wells to recharge the aquifers through filter-pit design



- Farm Pond
- Nala Bund
- Storage Tank
- Percolation Tank
- Check Dam

Land Management

Water Efficient Irrigation Technologies and Practices	Crop Rotation	
SRI (System of Rice Intensification) for Rice	Rice→Cowpea→Blackgram→Chili/Garden Pea→ Rice	
SWI (System of Wheat Intensification) for Wheat	Groundnut→Cowpea→Rice→Wheat→Groundnut Soybean→Wheat→Blackgram→Mustard→Soybean	
SCI (System of Crop Intensification) for Maize, Sorghum, Mustard, Blackgram		
Drip Irrigation for high value vegetable and fruit crops		
Irrigation at critical stages for Wheat (including crown root initiation and flowering stage), Soybean	Kharif	Rabi
Wadi (Agri-Horti based model) for fruit and vegetable crops	Maize + Blackgram + Groundnut + Maize + Okra + Pigeon Pea	Gram + Wheat + Chili/ Garden Pea + Mustard + Cowpea + Gram
Line Sowing for crops such as Soybean, Blackgram, Groundnut, Rice, Wheat, Mustard, Maize		

Also suggests areas suitable for:

- Conversion of wasteland
- Double cropping
- Fuelwood plantation
- Gap plantation
- Agro-forestry
- Agri-horti plantation (WADI model)

Livelihood Management

- Utilize locally available resources to create livelihood opportunities that ensure
 - food security and nutrition
 - curb poverty
 - provide sustainable agricultural practices
 - help in combating climate variability and related impacts, etc.
- Conventional livelihood practice has been agriculture, which as a result of climate variability and other crop failure consequences, has resulted in diminishing employment and financial gains
- A focus shift on non-agricultural, employment generating opportunities will help prevent people from migration, which is one of the biggest social challenges these watersheds are currently facing
- Variety of off-farm livelihood activities promoted: poultry, fishing, handicrafts
- Thru training programs livelihood activities related to handicraft, bee keeping, etc. demonstrated to the villagers

Summing Up

- IWRM is a means of achieving water security & WUE
- IWRM is not a one-size-fits-all prescription and cannot be applied as a checklist of actions
- Concept of “Local” IWRM applied to WCM planning in India
- IWRM Plan provides suggestions on activities of (1) water management, (2) land management, and (3) livelihood management
- Provides useful inputs to the District Irrigation Plan (DIP) of the Government, in terms of water supply and demand management synergized with the land management and livelihood improvement
- Advises district government to include water demand management measures to address water security challenges in DIP
- IWRM planning is shown to be a practical tool in district level planning
- At district level, IWRM can be planned through convergence of various schemes
- Developed through a participatory approach, in consultation with local stakeholders