HYBRID TRAINING ETIQUETTE DO'S AND DON'TS

BACKGROUND NOISE

See that there are no disturbances like background noises or people moving around to avoid distractions. Sit in a well lit and noise free room.

PROFILE/DISPLAY NAME

Choose a suitable profile picture. Name yourself formally the way you would want to present yourself in actual meeting. Identify yourself when you speak.

VIDEO ON/OFF

Some virtual meetings are required to keep the video on at all times. You can switch off the video if you face bandwidth issues. It is rude to switch off your video in a webinar when you toggle your webcam between on/off switches.

TEST EQUIPMENT AND INTERNET SPEED

Check laptop, mic, and speakers before joining the meeting. Choose a spot with unlimited and strong internet connection. Use headphones or earphones to reduce the background noise.

VIRTUAL ENVIRONMENT

Choose a simple backdrop/background that is pleasant and neat.

MUTE YOUR MIC

Always mute yourself while you are not speaking. Unmute yourself and speak only when it is your chance to speak.
BE POLITE, DO NOT INTERRUPT.

DRESS APPROPRIATELY

Make yourself presentable for online meetings. Keep a minimal style. The way you present yourself also indicates professionalism.

MIND YOUR BODY LANGUAGE AND VOICE OF OPINION

Be attentive and a careful observer, you will be in direct sight of everyone. Come in with additional insights to add value to the conversation.

KEEP YOUR QUESTION MINIMAL AND ON THE TOPIC

Questions or queries to resource person, facilitator or fellow participants should be sent using CHAT option or raise your hand. Be straightforward and time conscious.

BE PREPARED FOR TECHNICAL DIFFICULTIES

In case of voice issues, leave the meeting and join again by call/dial into the meeting platform for audio clarity. In case of technical glitches, be prepared to cover unforeseen events that could happen.

DON'T LEAVE THE MEETING WITHOUT INFORMING THE HOST

Thank the facilitator/host/speaker before leaving the meeting.

ATAL BHUJAL YOJANA (ATAL JAL)
Ministry of Jal Shakti
Department of Water Resources,
River Development &
Ganga Rejuvenation

ATAL BHUJAL YOJANA

Sustainable Ground Water Resource Management

Learning Duration- 4 Hours

Training Programme

Introductory

Session Overview

SL. No.	Session no	Topic	Sub Topic	Time (in Min)
1	Session 1	Introduction	Inauguration	5 mins
			Introduction	10 mins
			Objective Sharing	10 mins
2	Session 2	Atal Bhujal Yojana an Introduction	Overview on Sustainability of water	10 mins
			Introduction, Objective, Features, Stakeholders involved, Key Deliverables, Major Outcomes, Role stakeholders, Scope and Scale of Atal Jal in Haryana, Institutional Arrangement	30 mins
			Team Work: Team Formation	10 mins
BREAK				15 mins
3	Session 3	Issues related to Ground water sustainability	Recap of the Previous Session	5 mins
			1. Components of Ground Water Resource 2. Water Management Plan for one GP	25 mins
			Need for Efficient Water Use Practices	15 mins
			Presentation of the Work by teams/groups followed by Open Discussion and Final Remarks on Group Work	15 mins
LUNCH BREAK				45 mins

Session Overview

SL. No.	Session no	Topic	Sub Topic	Time (in Min)
4	Session 4	**Community Engagement in Water Resource Management**	Recap of the Previous Session	5 mins
			Introduction to Community Engagement in Ground Water Resource Management	20 mins
			Data collection, Monitoring and Evaluation of installed resources (Equipment installed under Atal Bhujal Yojana in GP)	10 min
5	Session 5	**Group Work**	Identify and suggest ways/ methods to engage with the stakeholders for Sustainable Ground water Management	40 mins
			Presentation of the Work by team	20 mins
			Open Discussion and Final Remarks on Group Work	15 mins
6	Session 6	**Feedback and Closing**	Summarization of the sessions and Feedbacks	10 mins
			End note	10 mins

Introduction

Session - 1

Module Overview

The following will be covered

01

Understand the critical components about the Atal Bhujal Yojana and sustainable ground water management

02

A Broader Overview on the Issues of Rural Ground Water Resource Management in India

03

Ground Water Source Sustainability and Current Ground Water Resource Management Best practices

04

Community Engagement in Ground Water Resource Management

Learning Objectives

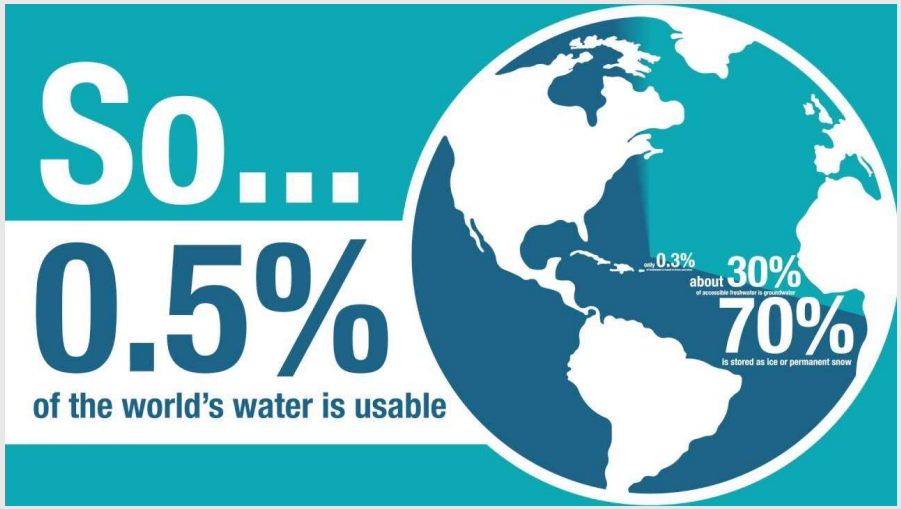
To let the participants know about Atal Bhujal Scheme

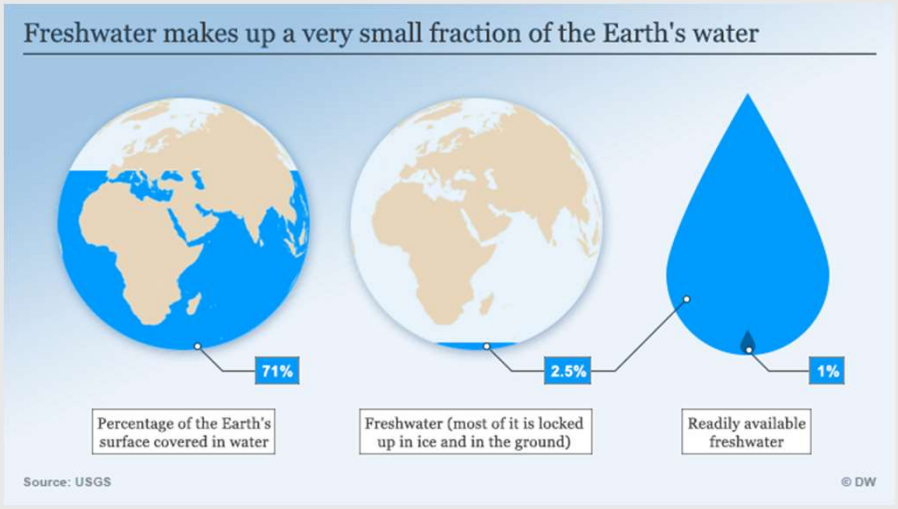
To introduce the concept of Ground water sustainability and rural ground water resources management in India and Haryana

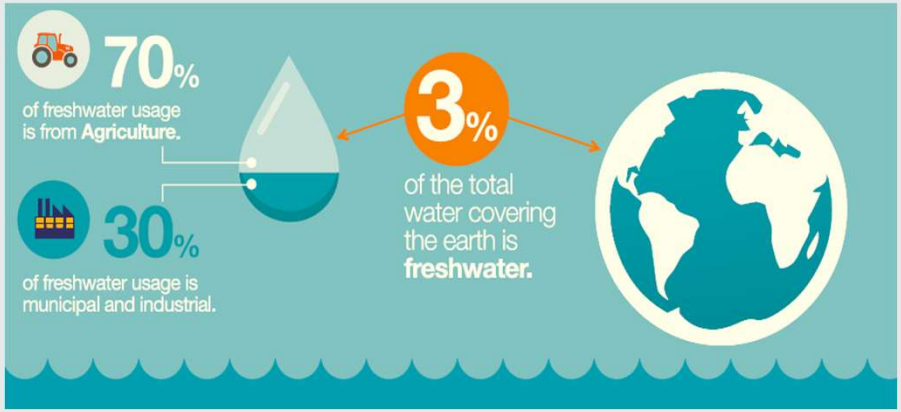
To make the participants understand the best practices of Sustainable Ground water resources

To make the participants understand the role of community in effective implementation of sustainable ground water management.

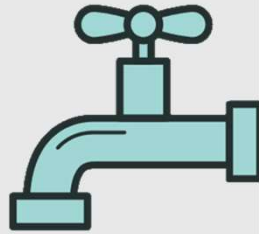
Water Facts - Worldwide Water Supply





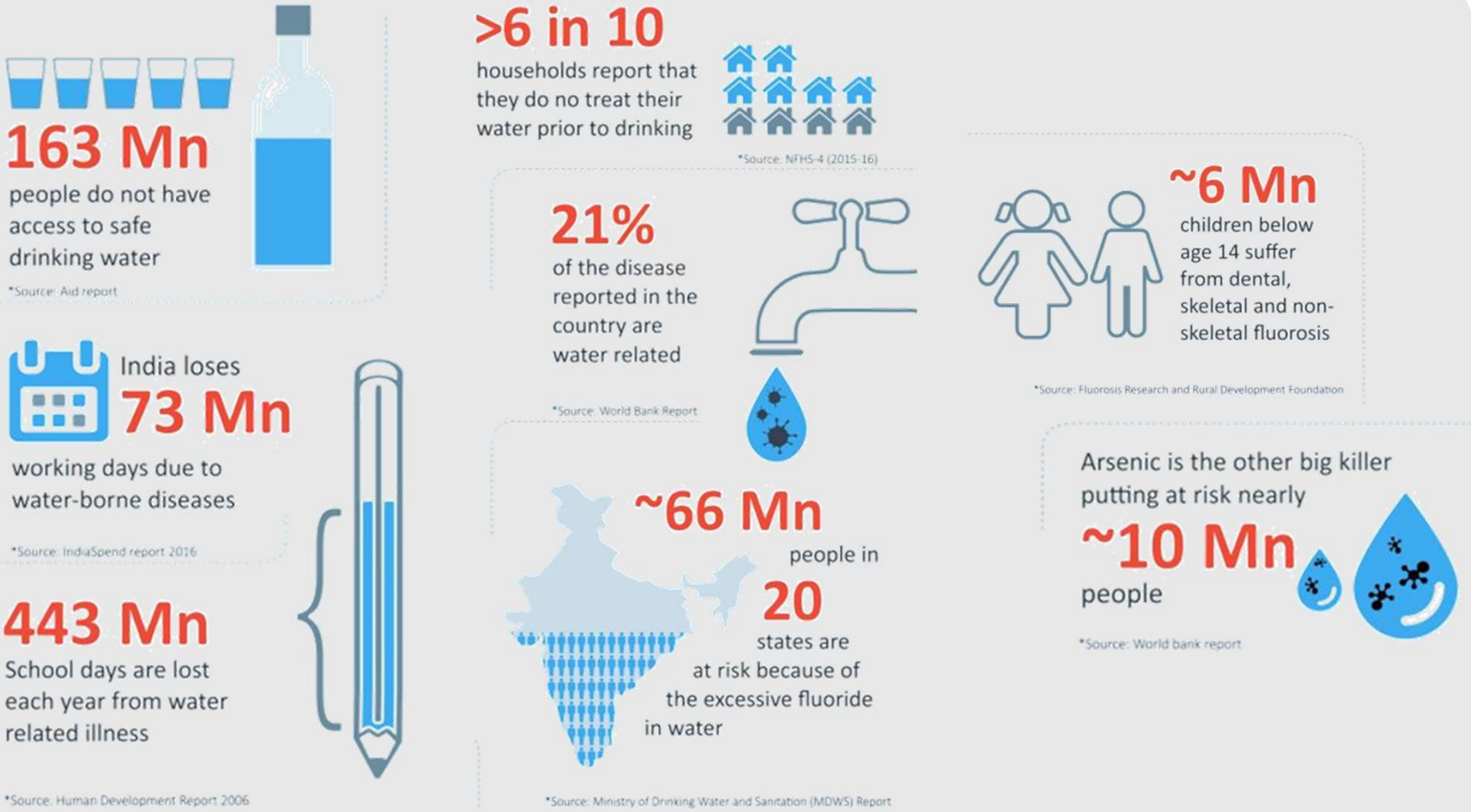


- If the world's water supply were only 100 litres (26 gallons), our usable water supply of fresh water would be only about 0.003 litre (one-half teaspoon).
- In actuality, that amounts to an average of 8.4 million litres (2.2 million gallons) for each person on earth.



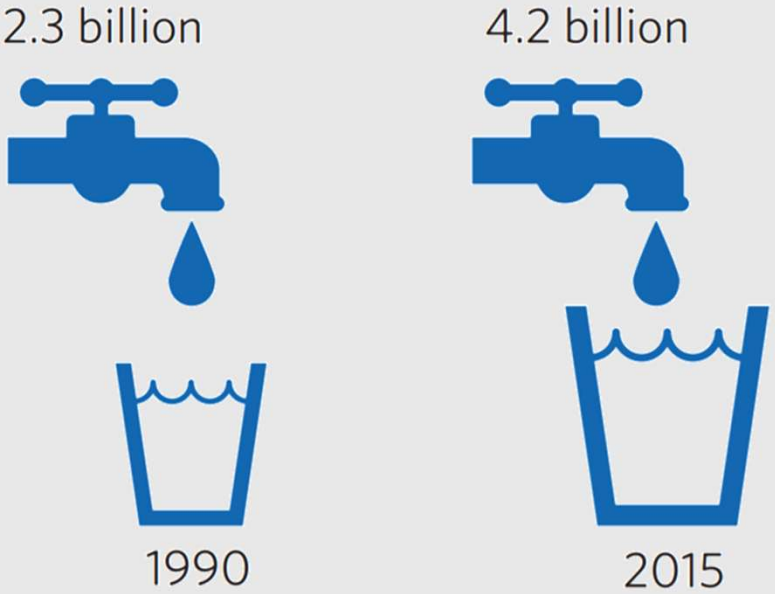
Source: Source: https://www.usbr.gov/mp/arwec/water-facts-ww-water-sup.html

Water Facts - India



Source: https://delhigreens.com/2019/03/22/an-infographic-on-the-drinking-water-challenge-in-india/

1.9 billion people have gained access to piped drinking water since 1990



Source: MDG Report 2015, UN

Water is a Basic Human Right !

The human right to safe drinking water was first recognized by the **UN General Assembly and the Human Rights Council** as part of binding international law in 2010.

Source: https://www.unwater.org/water-facts/human-rights/

SDG Water Facts - 2021

26% of world's population lacked safe drinking water services in 2020

44% of the household wastewater is not safely treated

1/5th of the world's river basins are experiencing rapid changes in area covered by surface waters

Source: https://www.unwater.org/water-facts/scarcity/

Water Stressed World

Today, 1.42 billion people – including 450 million children – live in areas of high or extremely high water vulnerability

Source: UNICEF, 2021

2.3 Billion people live in water stressed countries of which 733 millions are in high and critically water stressed countries

Source: UN-Water 2021

700 million people worldwide could be displaced by intense water scarcity by 2030

Source: Global Water Institute, 2013

Source: https://www.unwater.org/water-facts/scarcity/

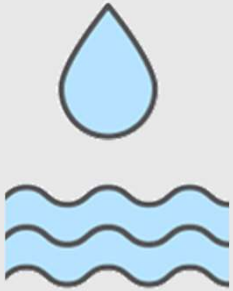
What will happen in Future?

If water resources are not efficiently managed and appropriately used then 700 million people worldwide could be displaced by intense water scarcity by 2030.

Source: Global Water Institute, 2013

Water Utilization in India

India has 16% of the world's population and 4% of its fresh water resources.



89% surface water use is agricultural and 2% and 9% are used by the industrial and domestic sector.

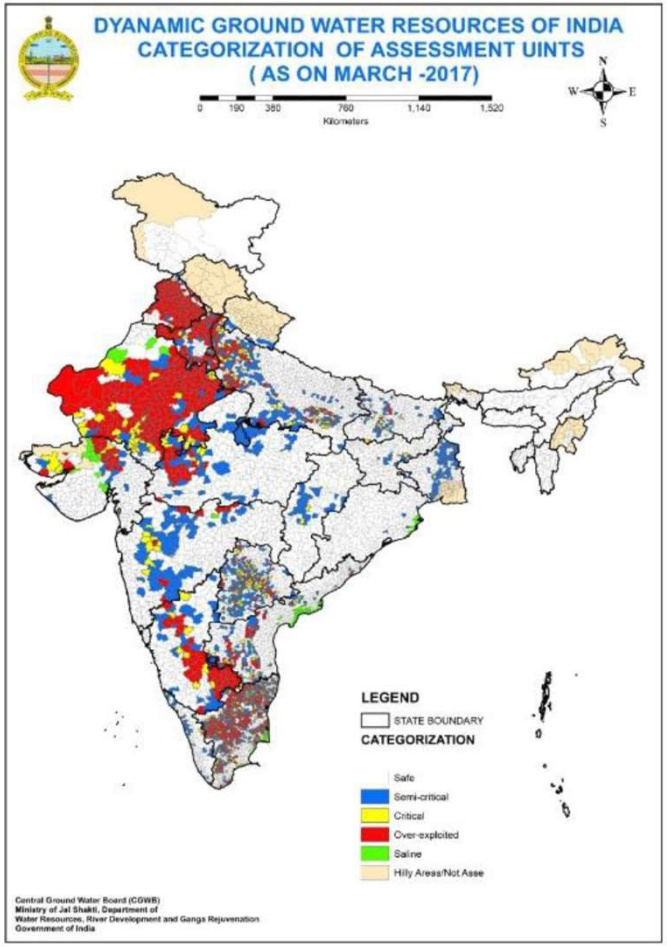
92% groundwater used in agricultural, 5% and 3% used for industrial and domestic sector.

4,000 BCM of fresh water from precipitation (rain and snow) most goes to seas via rivers.

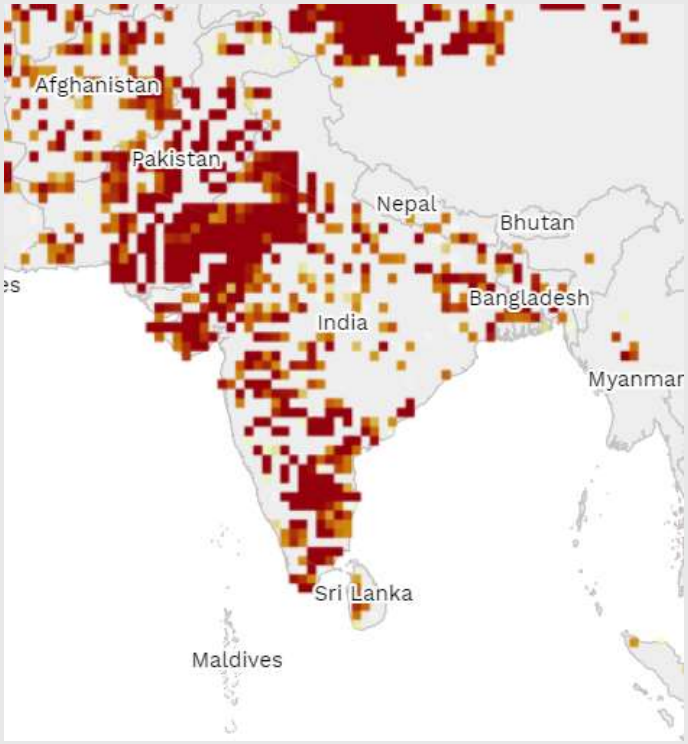
Surface and ground water availability is around 1,869 billion cubic meters (BCM) 40% is not available for use due to geological and topographical reasons.

Source: https://www.unwater.org/water-facts/scarcity/ ; https://www.unwater.org/water-facts/scarcity/; https://indiaclimatedialogue.net/2020/01/04/to-handle-water-crisis-overhaul-irrigation-2/

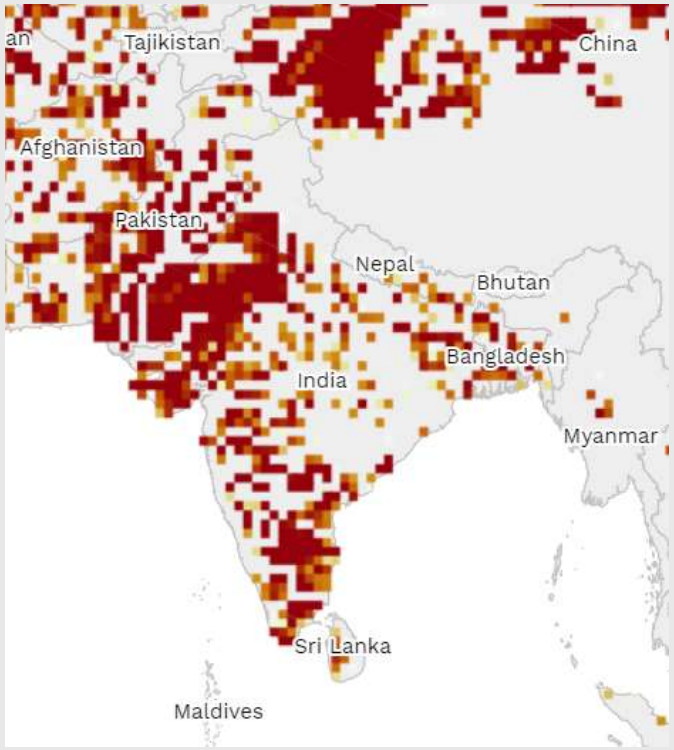
Water Scarcity and Water Stress- India



In 2020



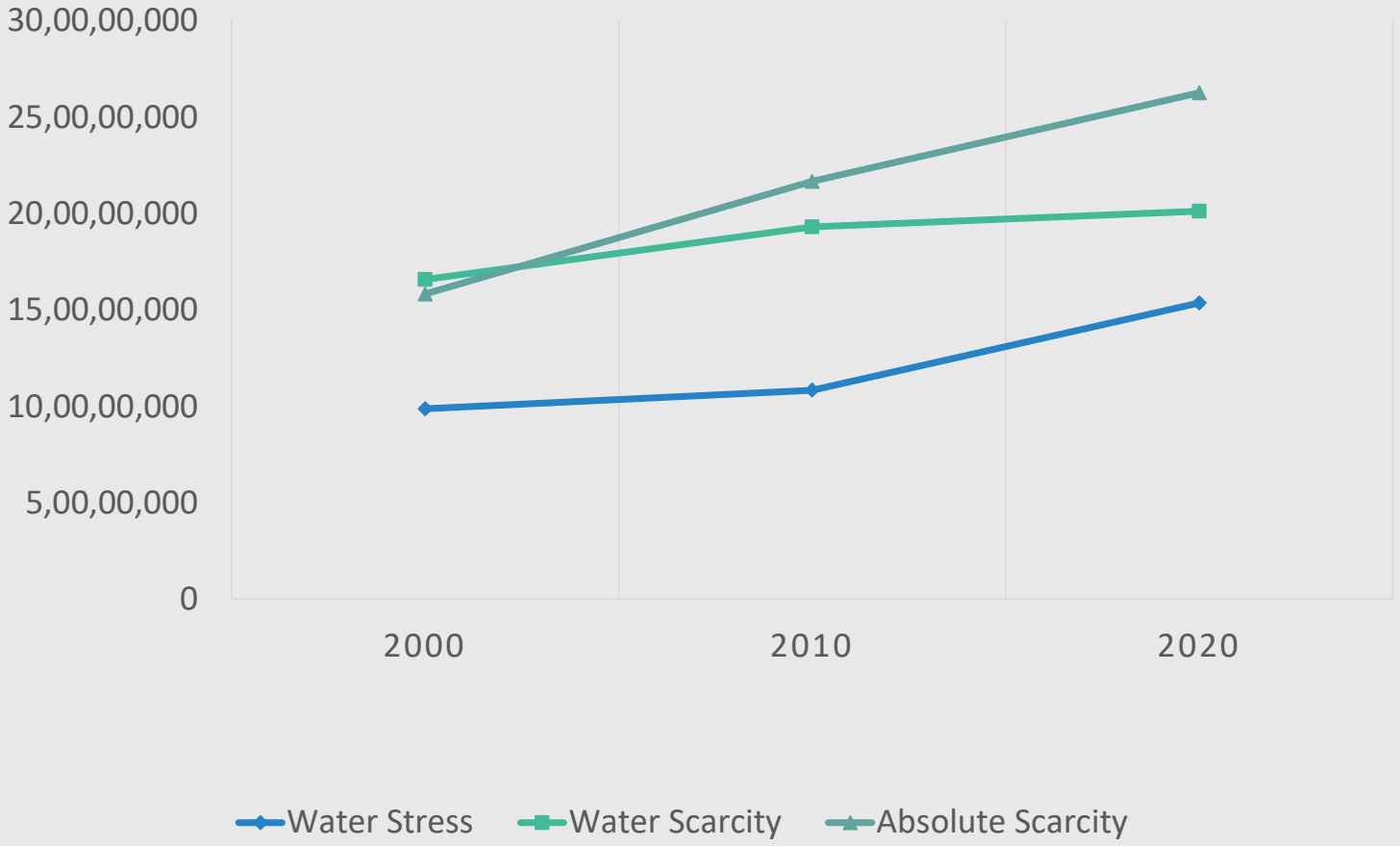
In 2030



AVERAGE WATER AVAILABILITY PER PERSON ● <500m3 ● 500-1,000m3 ● 1000-1,700m3 ○ >1,700m3

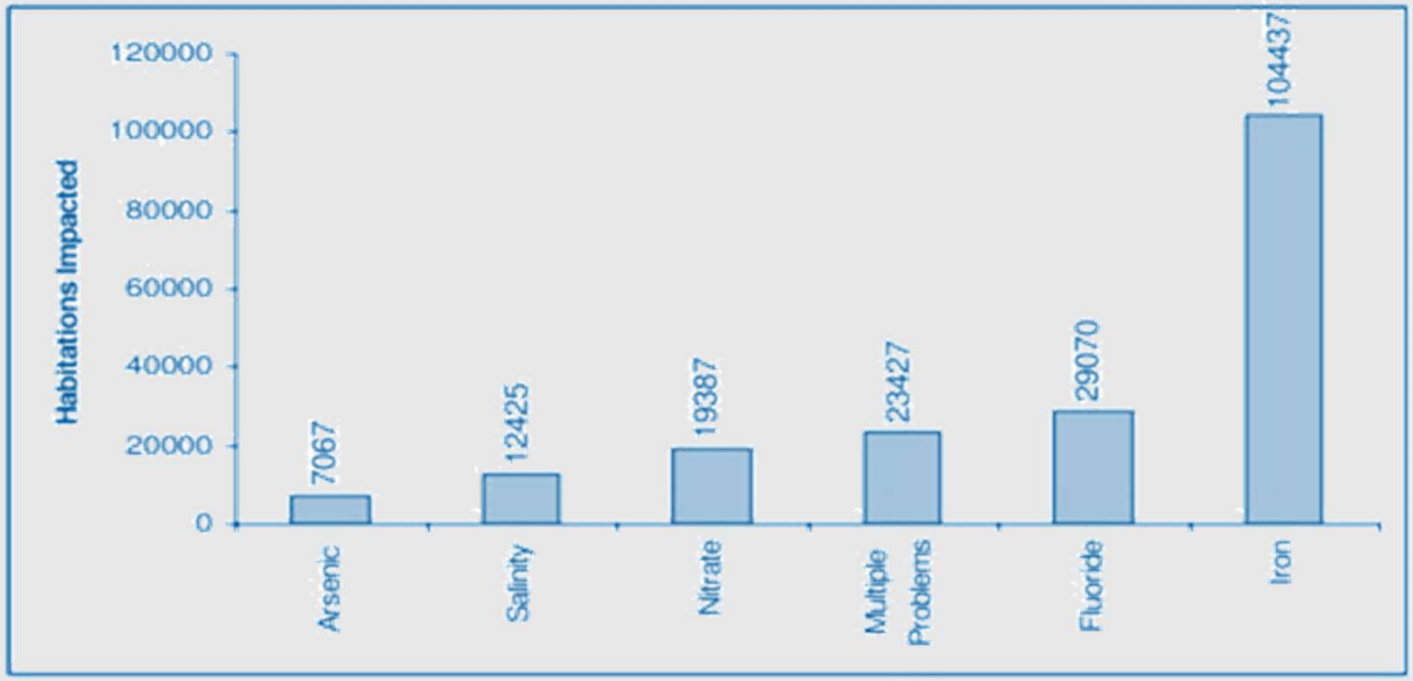
Source: https://worldwater.io/

Population in India Affected



Source: https://worldwater.io/

What all contaminates our water?



Source: https://www.adriindia.org/adri/india_water_facts

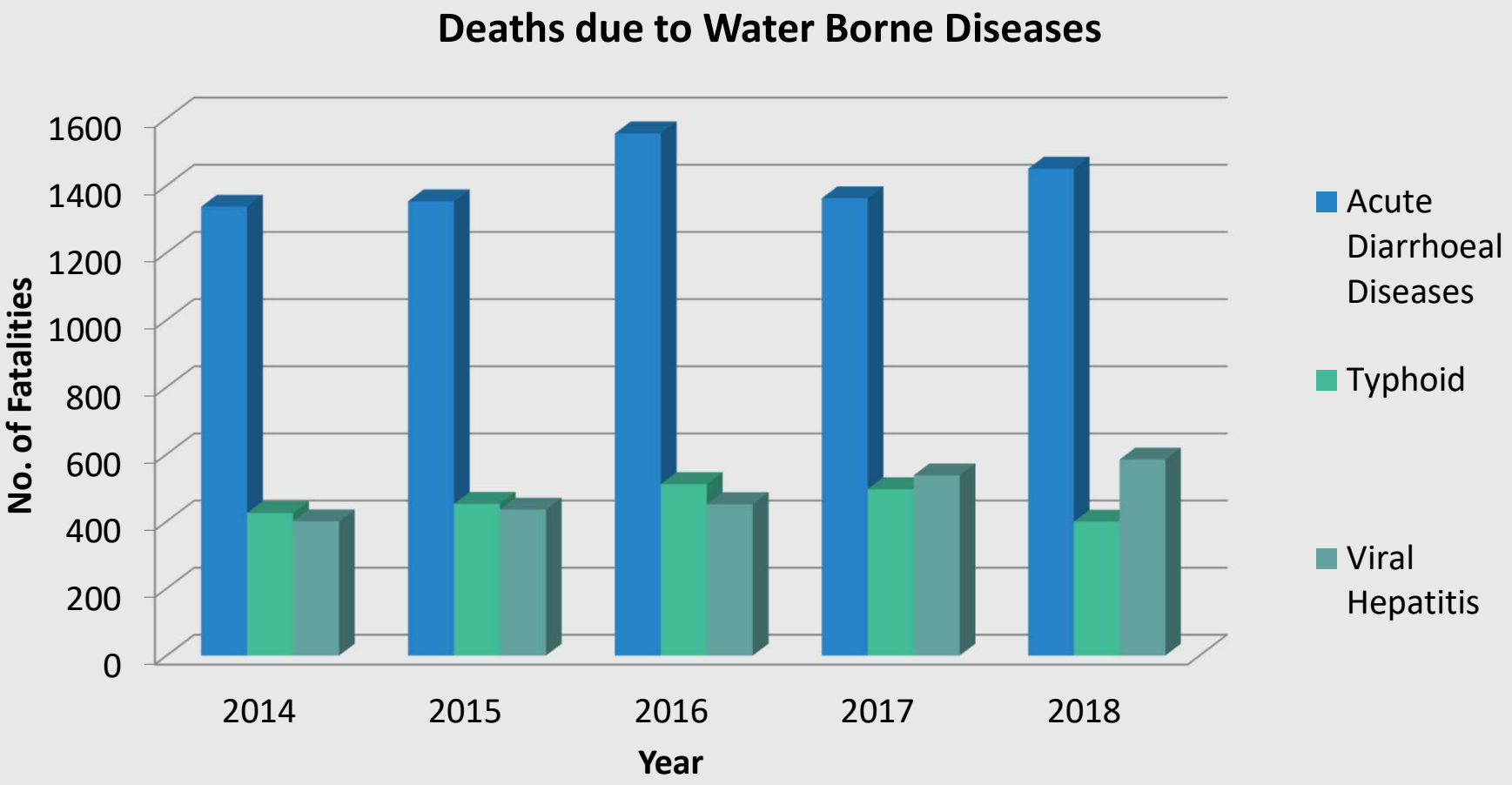
Source: Creator: © Parivartan Sharma / Reuters - https://scrollinfo.com/

What Happens when we consume impure and untreated water?

Annually **about 3 crore 77 lakhs Indians** are affected by waterborne diseases, **1crore 50 lakhs children die of diarrhoea.**

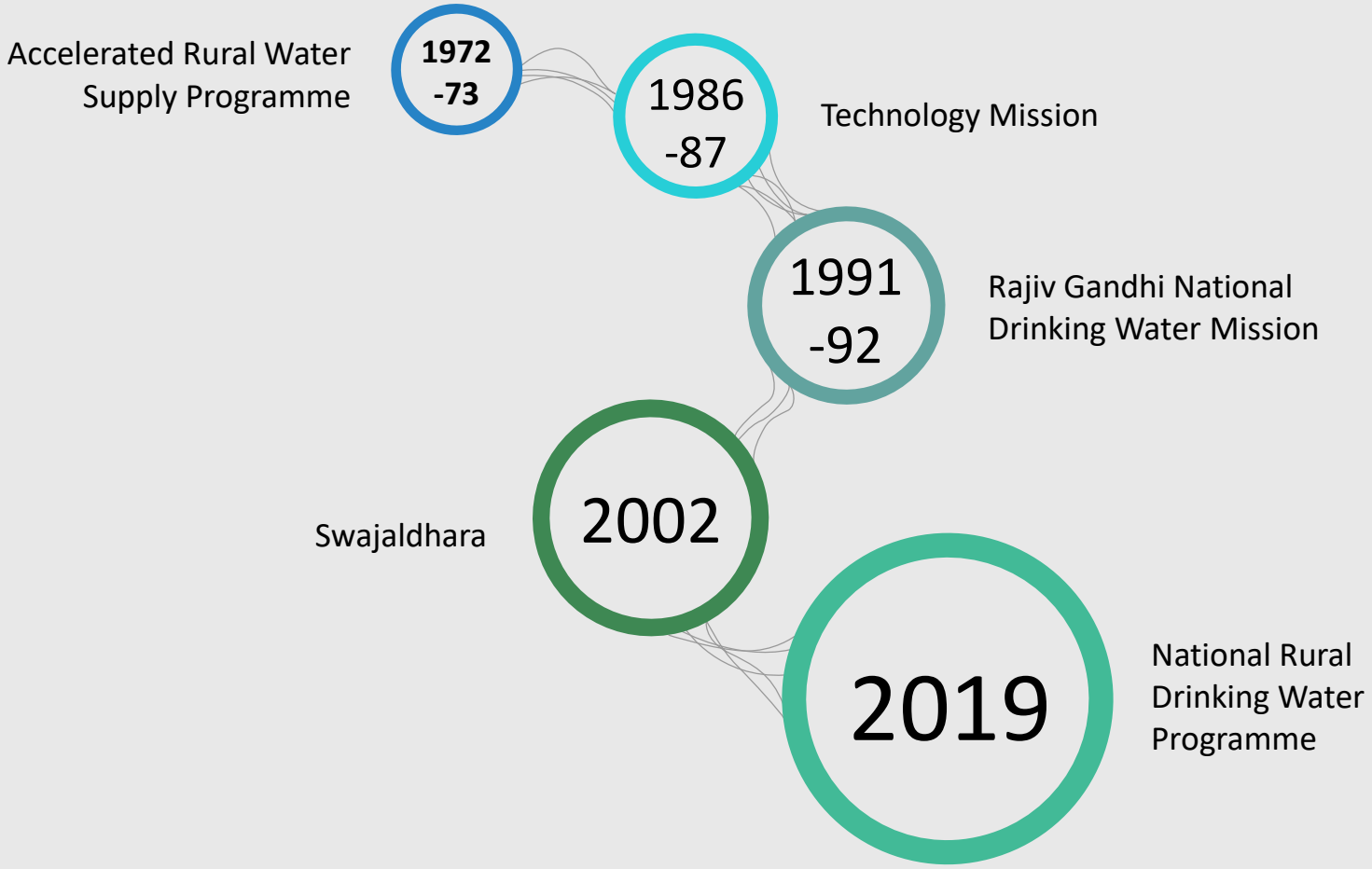
Source: https://www.indiawaterportal.org/

Lives Lost - India



Source: CBHI & Ministry of Health (https://timesofindia.indiatimes.com/india/polluted-water-killed-7-every-day-in-2018/articleshow/69996658.cms)

Plans & Programmes of Rural Water Supply in India



Atal Bhujal Yojana an Introduction

Session - 2

About Atal Bhujal Yojana Mission

PERIOD
2021-2025

CLIMATE RESILIENT
Source sustainability included-JSA & ABhY

BUDGET OUTLAY
Total estimated cost of Atal Bhujal Yojana is Rs. 6,000 Cr.

- 3000 Cr. — WORLD BANK
- 3000 Cr. — GOI

EQUITY & GENDER CONSIDERATION
Ensured

ABOUT ATAL BHUJAL YOJANA

ARICULTURE SENSITIVE

access to irrigation technology and better cropping patterns

GEOGRAPHY

Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh.

INCENTIVE LINKED

convergence of various schemes of central & state gov. and for sustainable ground water manag. through community participation

Source: https://ataljal.mowr.gov.in/

Objectives of ATAL BHUJAL YOJANA : Sustainable Ground water availability

1. Atal Bhujal Yojana would encourage community engagement and inculcate behavioural changes for judicious ground water management at Gram Panchayat level.
2. Strengthening the institutional and information framework through community based planning; monitoring; sharing and use of ground water data.
3. Capacity building of all stakeholders to demystify the complex science of ground water.
4. Community led groundwater management through a combination of demand side / supply side management measures
5. Support participating states in applying alternative approaches to groundwater governance through direct engagement with groundwater users and beneficiaries.
6. Facilitate sustainable groundwater management by operationalizing a results-oriented approach. Incentivizing behavioural change in various scheme interventions.

Source: https://ataljal.mowr.gov.in/

SALIENT FEATURES OF ATAL BHUJAL YOJANA

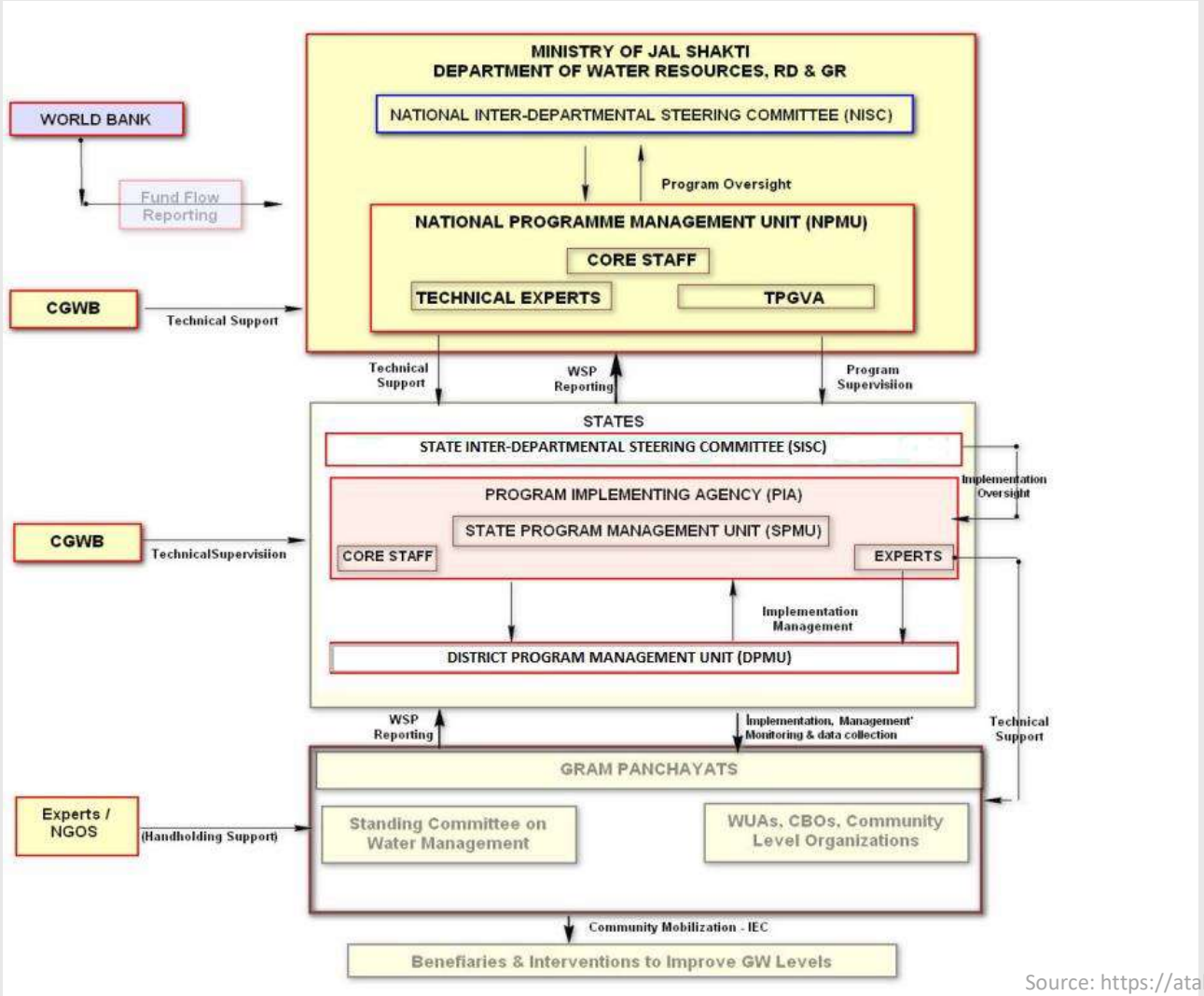
- Sustainable ground water management
- State-specific institutional frameworks for sustainable groundwater management
- Enhancement of groundwater recharge
- Improvement of water use efficiency
- Strengthening of community-based institutions to foster ground water management

Source: https://ataljal.mowr.gov.in/

Institutional Mechanism – Atal Bhujal Yojana

Apart from the basic mechanism, there will be :

- **Central Ground water Board**
- **Experts and NGO's**
- **At GP level no new institution will be formed. The existing Village Water and Sanitation Committees or Pani Samitis, will be responsible for the implementation, will be strengthened, if required, with additional members and capacity.**



Source: https://ataljal.mowr.gov.in/

ATAL BHUJAL YOJANA: KEY FIGURES

Area of Implementation

S.NO.	State	Districts	Blocks	GPs
1	Gujarat	7	34	2201
2	Haryana	14	36	1658
3	Karnataka	14	41	1199
4	Madhya Pradesh	6	9	672
5	Maharashtra	13	38	1339
6	Rajasthan	17	38	1144
7	Uttar Pradesh	10	26	550
	TOTAL	**81**	**222**	**8763**

Allocation of funds

Component	NPMU	GUJ	HAR	KAR	M.P	MAH	RAJ	U.P	TOTAL
Institutional Strengthening And Capacity Building	159.33	217.65	207.15	194.51	103.62	188.26	164.68	119.28	1354.48
Incentive		539.11	470.52	1007.01	210.92	737.51	1024.97	609.96	4600.00
TOTAL	**159.33**	**756.76**	**677.52**	**1201.52**	**314.54**	**925.77**	**1189.65**	**729.24**	**5954.48**

Incentives with Disbursement linked indicators

Selection of DLIs has been guided by (i) activities which need to be done for sustainable management of ground water, (ii) measurability and ease of verification and (iii) capacity of stakeholders to achieve the results.

Sl. No	Component	Remark
DLI#1	Public disclosure of ground water data/information and reports	This DLI incentivizes the strengthening of groundwater management institutions to ensure collection and public disclosure of groundwater related information.
DLI#2	Preparation of Community-led Water Security Plans	This incentivizes the roll-out of a standardized bottom-up participatory groundwater planning process.
DLI#3	Public financing of approved Water Security Plans through convergence of ongoing/new schemes	The DLI incentivizes the use of the standardized bottom-up groundwater planning process to improve the effectiveness of public financing and align implementation of various government programs on groundwater.
DLI#4	Adoption of practices for efficient water use	This incentivize the implementation of demand-side measures within the WSPs to improve groundwater conditions.
DLI#5	Improvement in the rate of decline of groundwater levels	incentivizes the arrest in decline of groundwater levels

Source: https://ataljal.mowr.gov.in/

Allocation of Disbursement linked indicators

Selection of DLIs has been guided by (i) activities which need to be done for sustainable management of ground water, (ii) measurability and ease of verification and (iii) capacity of stakeholders to achieve the results.

Component	DLI No	DLI Description	DLI %	DLI Allocation (Rs Cr)
Institutional Strengthening & Capacity Building -	**1**	Public disclosure of groundwater data/information and reports	**10**	**460**
	2	Preparation of Community-led Water Security Plans	**15**	**690**
Incentive Component	**3**	Public financing of approved Water Security Plans through convergence of ongoing/new schemes	**20**	**920**
	4	Adoption of practices for efficient water use	**40**	**1840**
Resultant of the Both Components	**5**	Improvement in the rate of decline of groundwater levels	**15**	**690**

Source: https://ataljal.mowr.gov.in/

What needs to be Implemented?

i) State-specific institutional frameworks for sustainable groundwater management, ii) Enhancement of groundwater recharge, iii) Improvement of water use efficiency, and iv) Strengthening of community based institutions to foster ground water management. These will be implemented by :-

1. **Demand-side interventions – Related to Agriculture**

   (i) Micro-irrigation practices such as drip/sprinkler systems, (ii)Underground pipelines, (iii)Crop diversification including promotion of rainfed horticulture, (iv)Feeder separation for irrigation power supply, (v)Pressurized irrigation in canal command areas, and (vi)Any other area-specific water efficient/water-saving methods and practices.

2. **Supply-side interventions – Related to Structure**

   (i)Check dams, (ii)Percolation ponds, (iii)Drainage line treatment (ridge to valley approach),

   (iv)Recharge trenches/shafts/wells, (v)Farm ponds, (vi) Gully plugs/Nala/Nalla bunds/gabions, and (vii) Any other area-specific recharge/water conservation/rainwater harvesting method.

These can be added to based on specific needs of local ground water situations.

Source: https://ataljal.mowr.gov.in/

Who will Implement what?

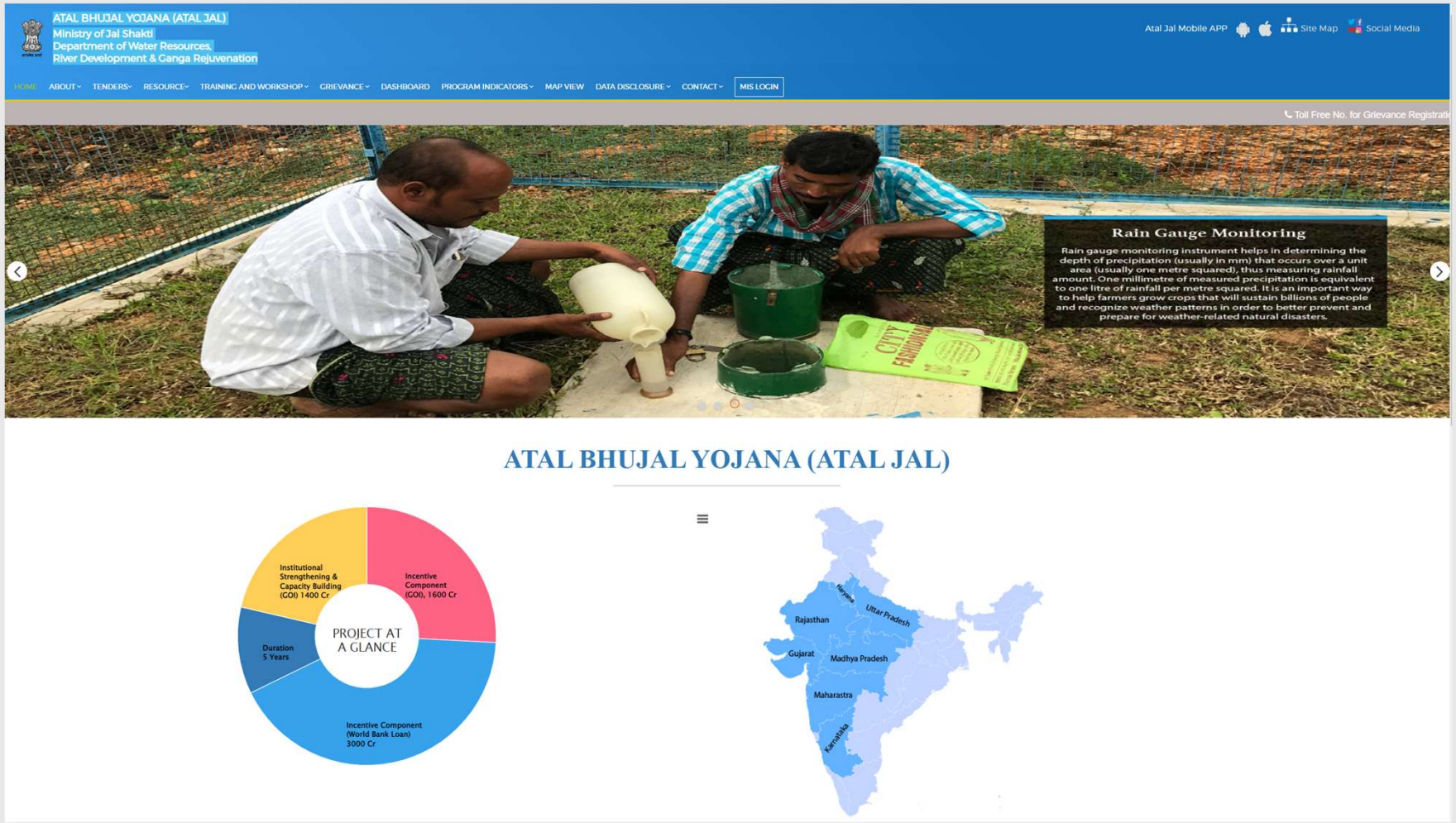
Level of Governance	Work to be implemented
Gram Panchayat (GP) Level	i) Ensuring community participation in planning sustainable management of ground water, ii) Development of GP level water budgets iii) Preparation of GP-level Water Security Plans (WSPs).
State Level	i) The WSP, aggregated at the district-level will be consolidated at the state level by the SPMU ii) Program implementation management iii) Procurement iv) Financial Management v) Institutional strengthening and improving capacities vi) Citizen's feedback, Grievance Redressal System
Central Level	i) Coordination of the scheme at the national level. ii) The States will submit approved state-level Plans to the NPMU for data, budget, and expenditure consolidation and finally to the National Inter-Departmental Steering Committee for ratification. iii) Implementation and Facilitation of Approvals, M&E functions and Training and capacity building activities.

Source: https://ataljal.mowr.gov.in/

EXISTING CHALLENGES THAT ATAL BHUJAL YOJANA INTENDS TO OVERCOME

Source: अटल भूजल योजना (अटल जल) - YouTube

Overview of Dashboard of Atal Bhujal Yojana



Scan the QR code to access ABhY dashboard

Source: Atal Bhujal Yojana(Atal Jal) (mowr.gov.in)

Learning Resources

Scan the QR code to access Atal Bhujal Guidlines
or Website http://jalshakti-dowr.gov.in/sites/default/files/Atal_Bhujal_Yojana_Program_Guidelines_Ver_1.pdf

Scan the QR code to access Atal Bhujal – Dashboard or Website
https://ataljal.mowr.gov.in/Home/Index

Scan the QR code to access Atal Bhujal News
or Website https://ataljal.mowr.gov.in/

Source: http://www.spain-india.org/

Issues related to Ground Water and Best practices for implementation and mitigation

Session - 3

Water Source Sustainability

Water is a finite and irreplaceable resource that is fundamental to human well-being. It is only renewable if well managed.

In case of consumerism of water, agricultural sector guzzles upto 70% of the world's annual water consumption, and it will be one of the first to feel the strain as demand supersedes water capacity.

As climate change is hitting hard with each passing year it has become extremely important to rethink and rework over water resource sustainability.

A sustainable water system is one that can meet performance requirements over the long-term.

Source: https://www.nap.edu/read/5291/chapter/7

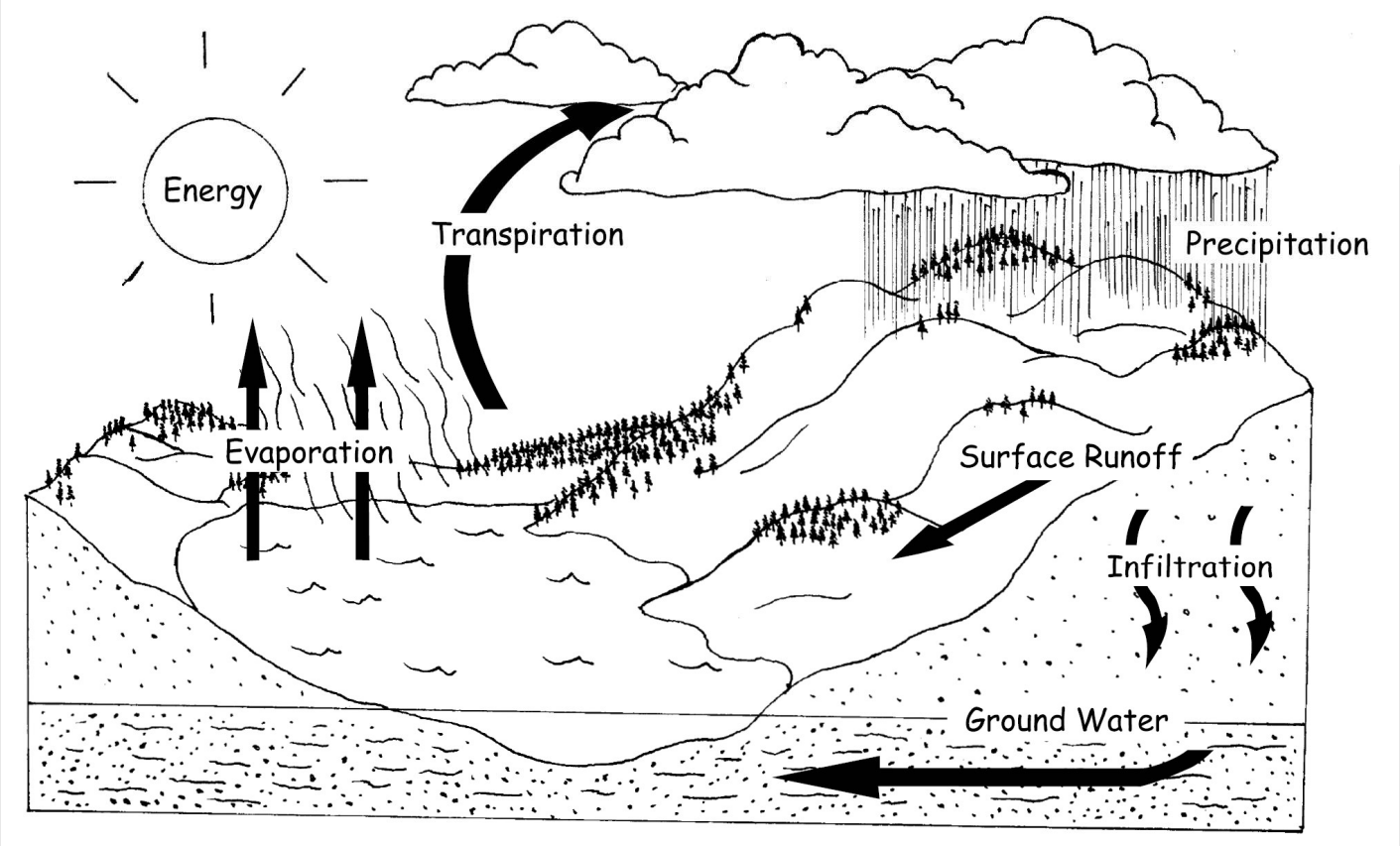
Water systems have the following characteristics

- a commitment to meet service expectations
- access to water supplies of sufficient quality and quantity to satisfy future demand
- a distribution and treatment system that meets customer expectations and regulatory requirements
- the technical, institutional, and financial capacity to satisfy public health and safety requirements on a long-term basis

Source: https://www.nap.edu/read/5291/chapter/7

Water Sources

Water cycle and various sources of water.



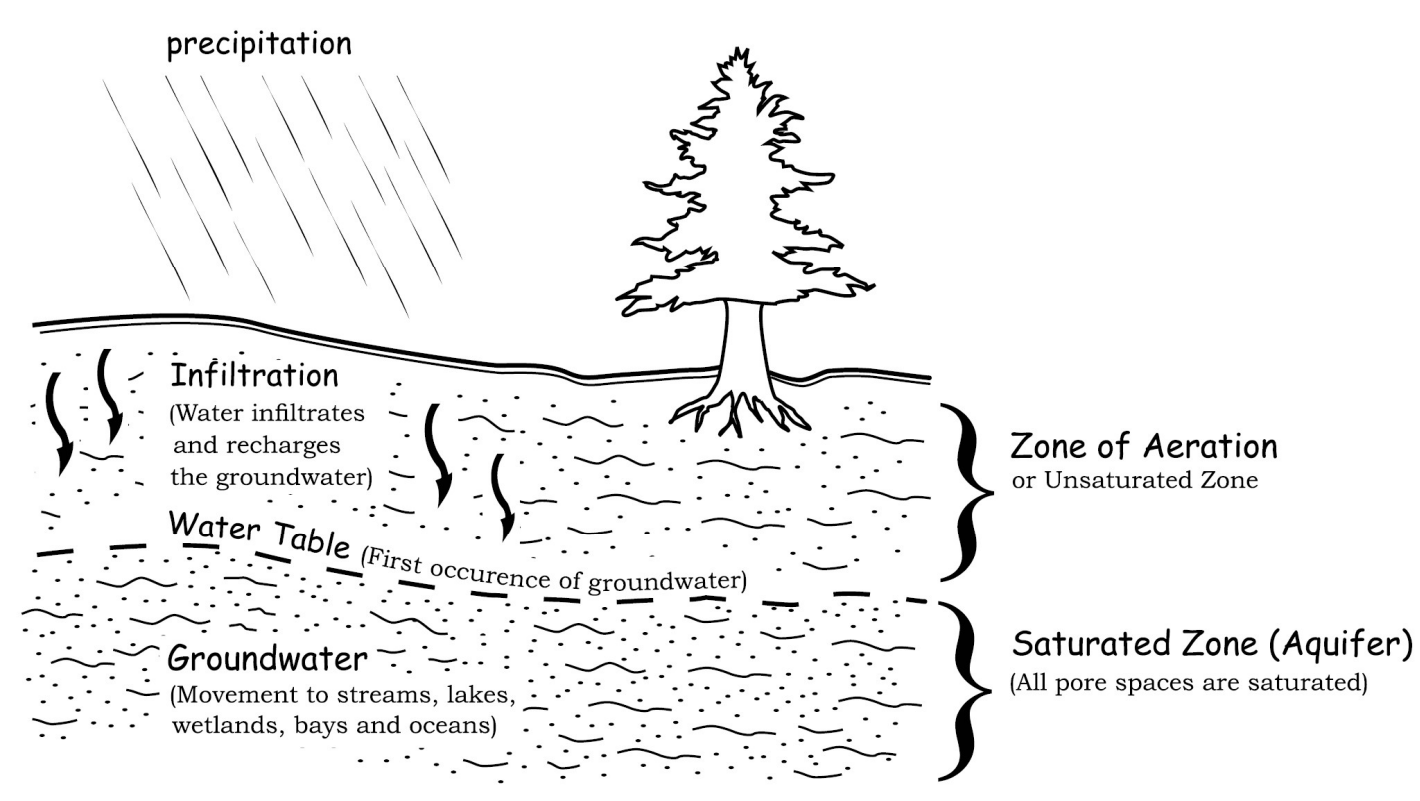
Ground Water Zones

ATAL BHUJAL YOJANA (ATAL JAL)
Ministry of Jal Shakti
Department of Water Resources, River Development & Ganga Rejuvenation

Water cycle and various sources of ground water.

Factors that influence the recharge rate are:

a. **Climate**
b. **Terrain or topographic relief**
c. **Geology**
d. **Type and amount of vegetative ground cover**



Factors affecting Ground Water Quantity & Quality

1. Overuse of groundwater for urban, rural and industrial uses can cause temporary or permanent declines in the quantity of available groundwater. Overuse can also cause subsidence, where the land sinks.
2. Climate change is fast becoming an important factor in unpredictable water precipitation leading to larger surface runoff and limited recharge.
3. When it rains, these pollutants become part of the storm water runoff. So it is an important lesson – if we want clean groundwater and surface water, we need to prevent all possible pollutants from being poured on the ground or spilled onto surface water untreated.
4. Untreated Industrial waste and fertilizers are a major concern for ground water quality.
5. GROUND WATER DEPLETION (IN FRESH GROUND WATER QUALITY AREA)
6. WATER LOGGING (CENTRAL HARYANA DUE TO SALINITY AND INTENSIVE CANAL IRRIGATION)
7. GROUND WATER SALINITY PROBLEM (CENTRAL PART)
8. CULTIVATION OF WATER INTENSIVE CROPS (CANE, AND PADDY) IN O.D. BLOCKS (IN FRESH GROUND WATER AREA)

Source: Central Ground Water Board Haryana Hand book 2015-16

Ground water situation in India

North western part of India has the most critical Ground water situation both from quantity and depth as well as the concentration of Arsenic and Fluoride contamination.

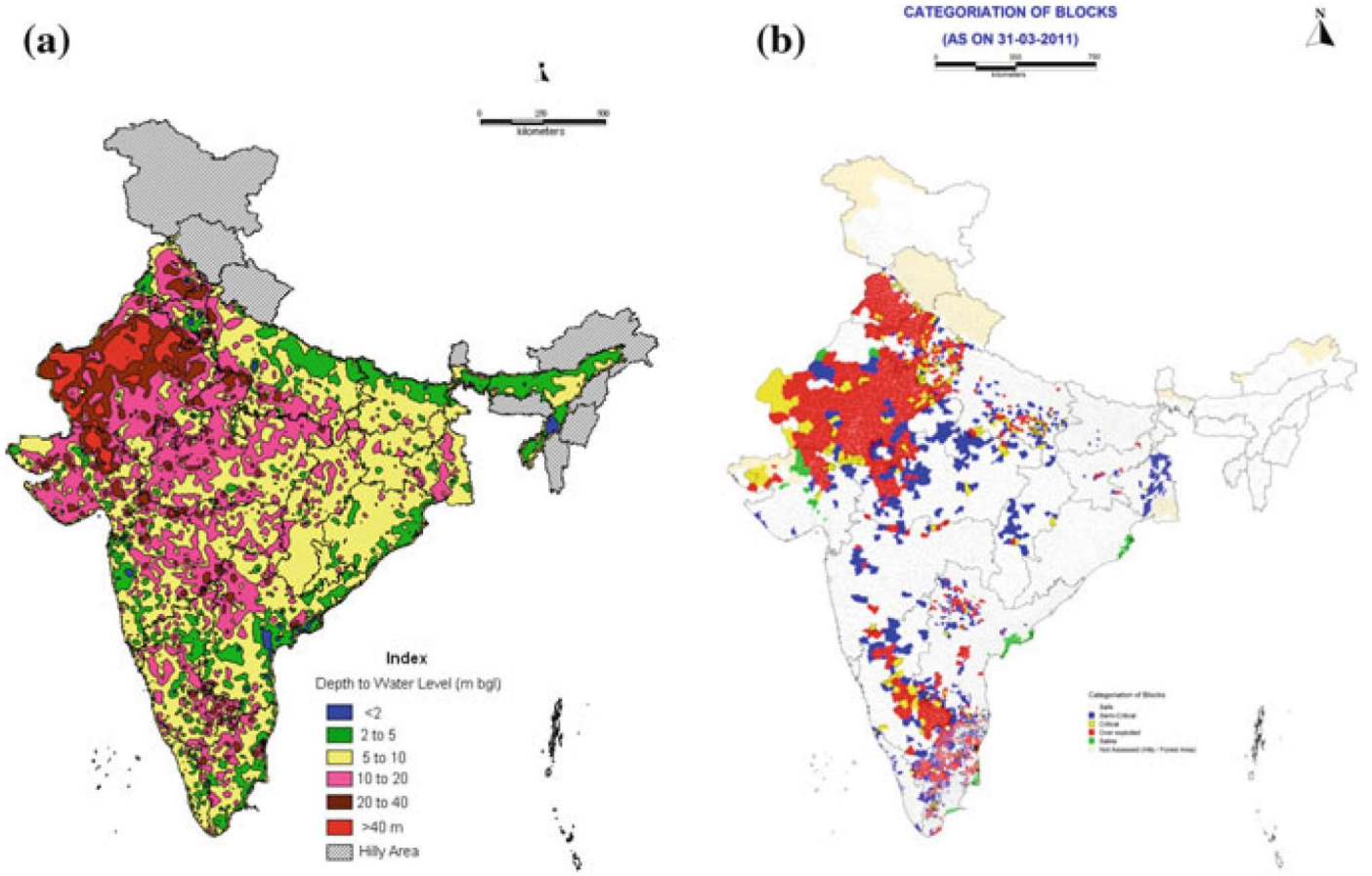
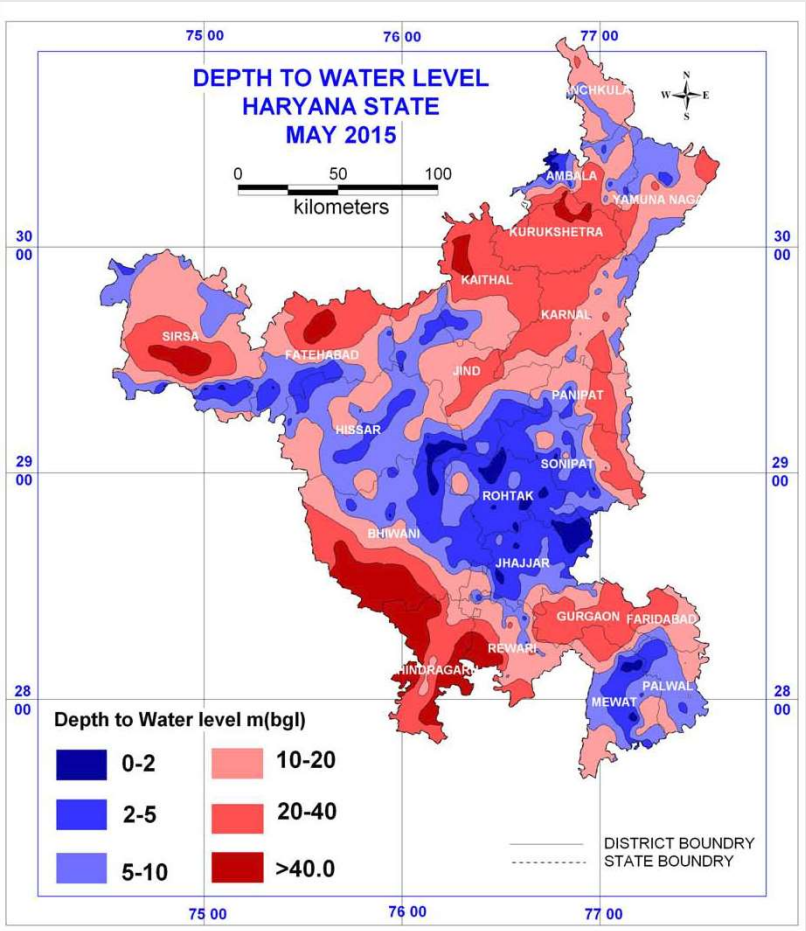
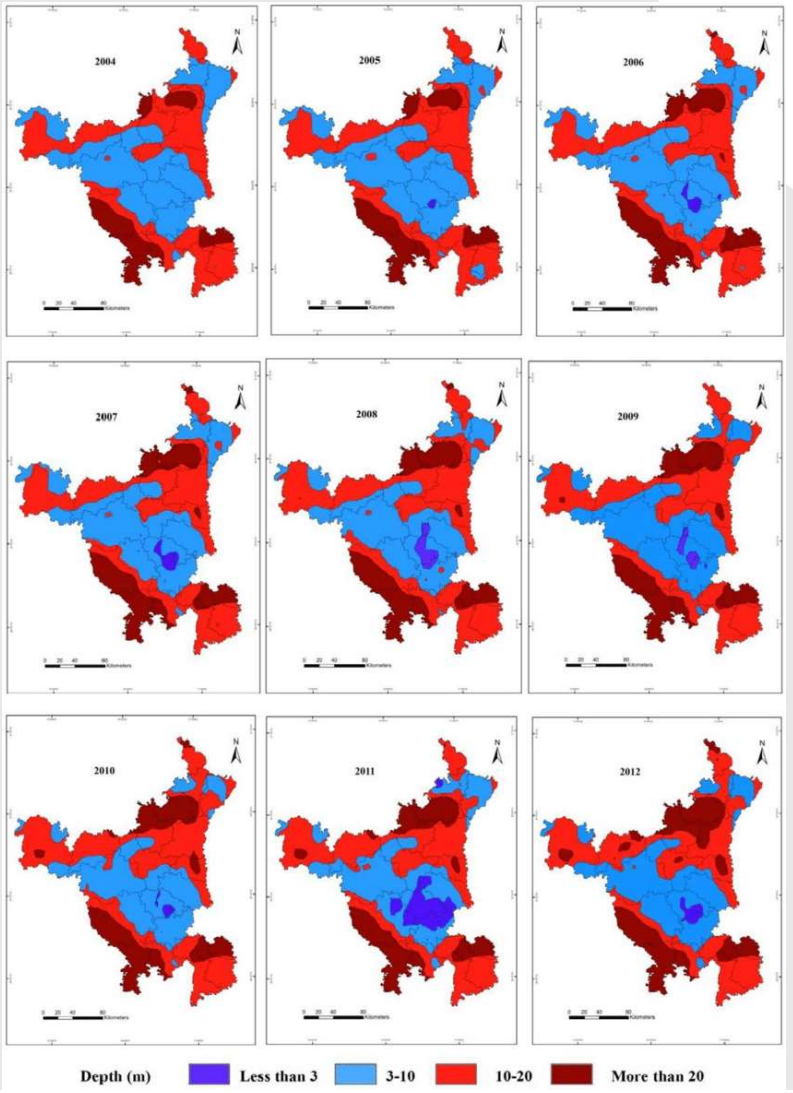


Fig. 1 **a** Depth to water level map of premonsoon 2016. **b** Categorization of assessment units based on SOD. Colors represent as (*Red* = OE, *Yellow* = Critical, *Blue* = Semi-critical, *Green* = Saline and *White* = Safe). *Source* CGWB

Ground water situation in Haryana

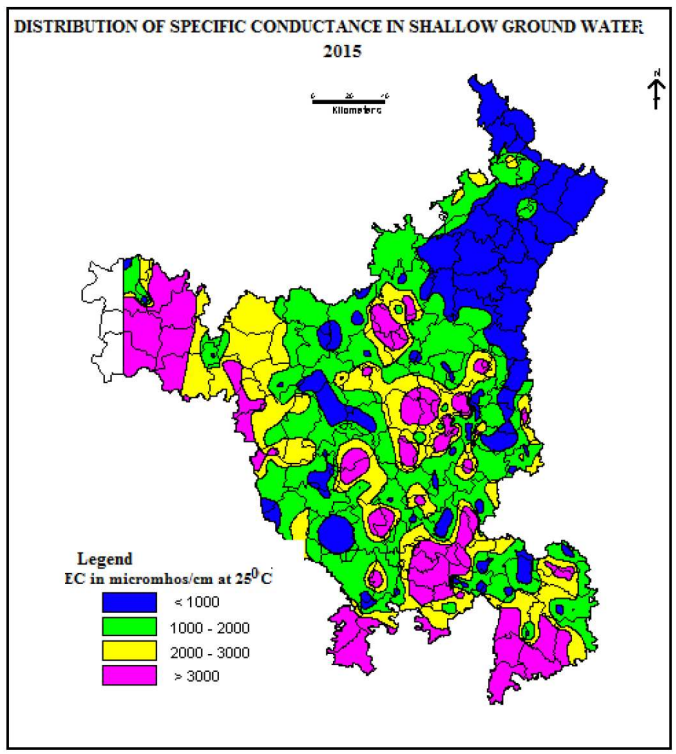
Haryana has multiple blocks in which the Ground water is at critical levels and has been increasing over the years.

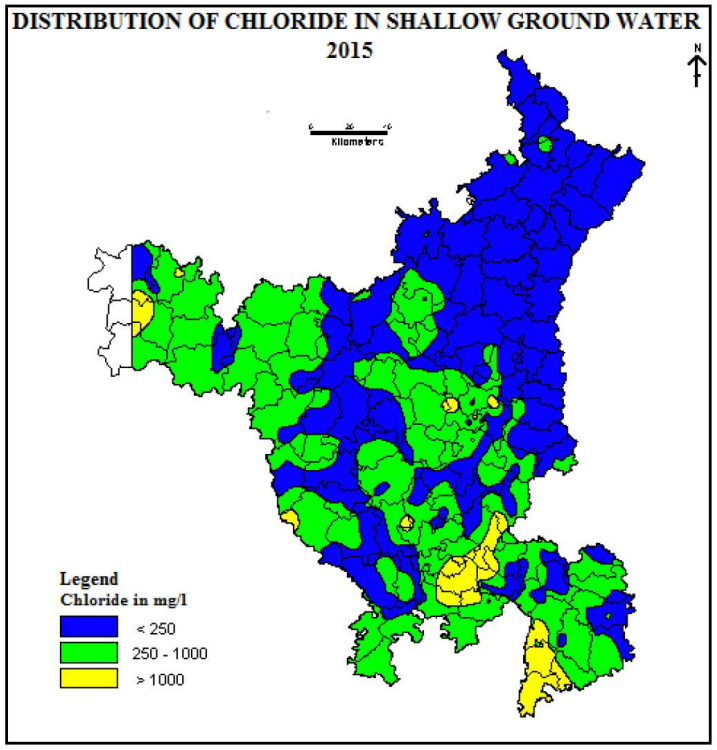


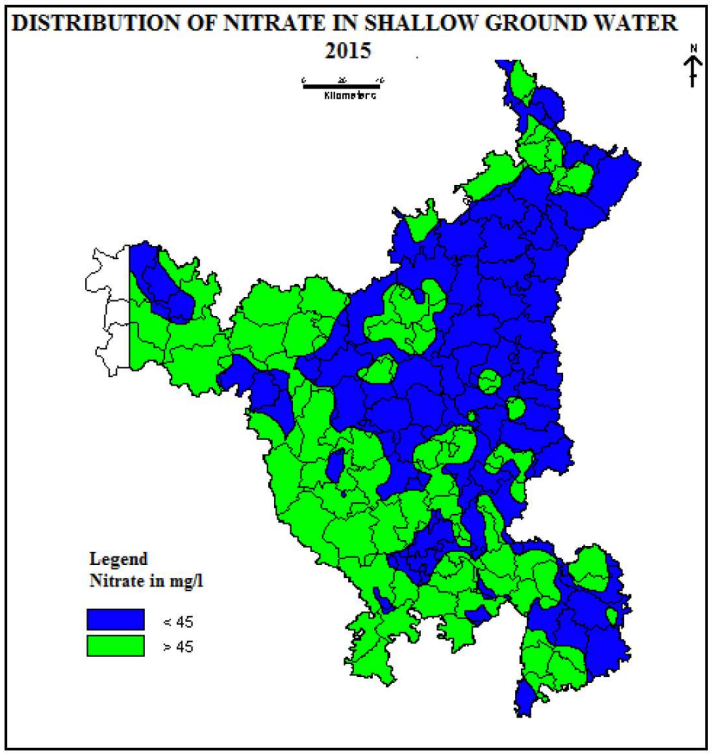


Ground water quality in Haryana

The south western blocks of Haryana has larger contamination which must be taken corrective measures for.







Ground water state in Haryana

i) Data is being collected from the grid points established at 20 Sq. Km. in the State.

ii) The State Average decline in water table from June, 1974 to June 2018 is - 10.38 mtrs.

iii) In districts Kurukshetra, Karnal, Kaithal, Bhiwani, Fatehabad, Panipat Rewari, Sirsa & M.garh there is huge depletion of ground water due to fresh ground water zones and paddy irrigation.

iv) On the basis of Dynamic Ground Water Resource estimation as on 31.3.2013, the blocks have been categorized as Over Exploited, Critical, Semi Critical and Safe. Presently, out of total 119 assessed blocks, the number of Over Exploited, Critical, Semi Critical and Safe blocks in the State are 64, 14, 11 and 30 respectively.

v) Central Ground Water Authority (CGWA), New Delhi has notified 21 no. of blocks to regulate groundwater development in the State.

vi) In Haryana there is approximately 8.48 lakh no. of tube-wells out of which 2.98 lakh are diesel operated and 5.50 lakh are electric operated.

vii) The ground water quality in 45% of the area of the State is not good for irrigation due to salinity based on Electric Conductivity (E.C.) parameter (E.C.>2000 Micro. Mhos/cm.

viii) In the State 10% area is under water logging condition (data report for the period June, 2018).

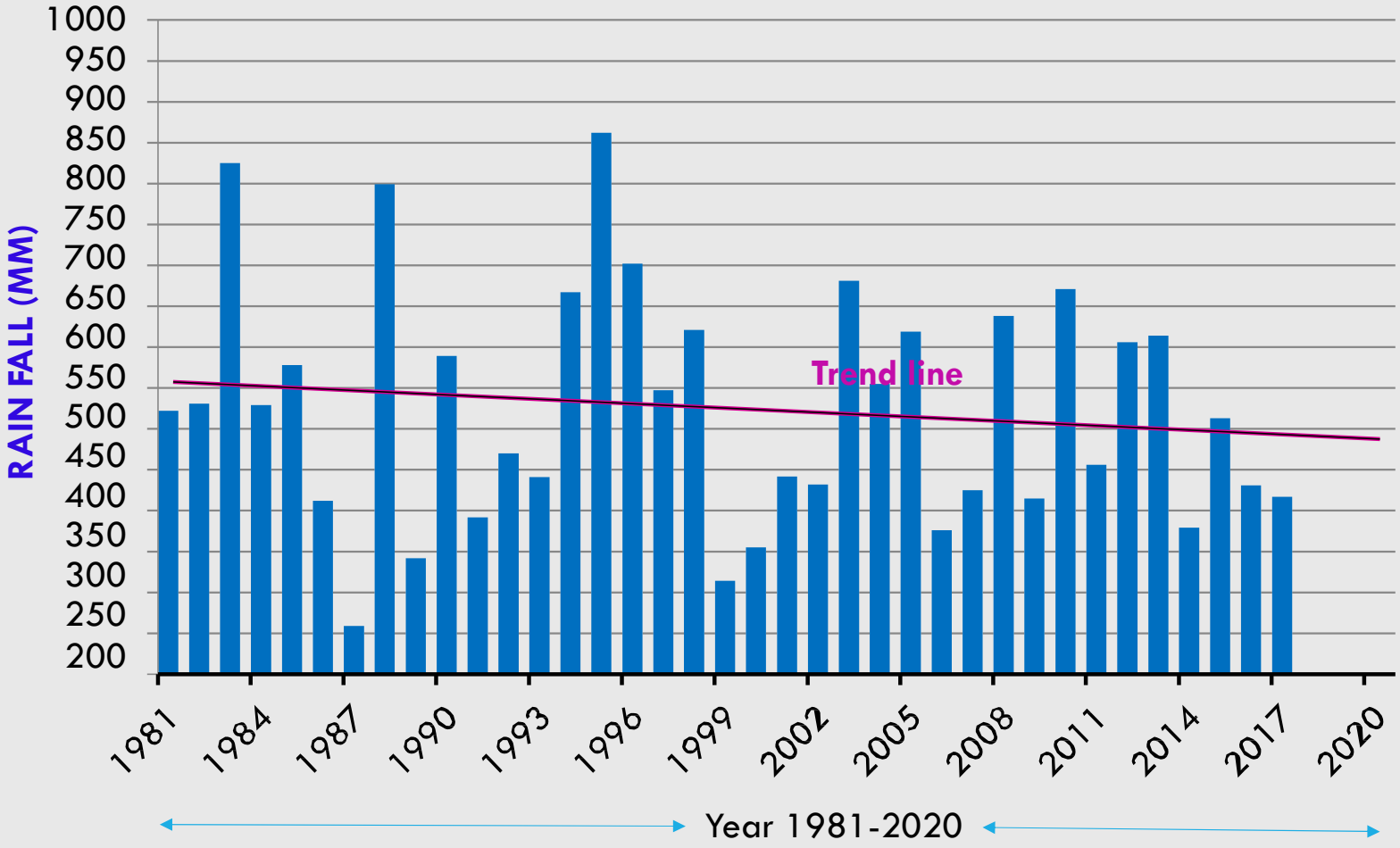
Basic AGRICULTURE statistics of Haryana

Total Geographical Area - 44,212 (Sq. Km.)			
Cultivable area (Sq. Km.)	Net Area Irrigated (Sq. Km.)		
36,760 (83.15%)	29,740*		
	By Canals (Sq. Km.)	Tube wells (Sq. Km.)	
	11,530 (38.80%)	18,210 (61.20%)	
		During year 2016-17*	
		No. of Tube wells (2017-18)	
		847750*	
		Diesel Pump Sets	Electric Pump Sets
		297616*	550134*

NOTE:- " * " Tentative

Source: Ground water cell Haryana

Average RAIN FALL of Haryana



Source: Ground water cell Haryana

District wise water table of Haryana

Sr. No.	District	DEPTH TO WATER TABLE (METRES)		FLUCTUATION IN WATER TABLE (METRES JUNE 1974 TO JUNE, 2018
		JUNE, 1974	JUNE, 2018	1974-2018
1	AMBALA	5.79	11.44	-5.65
2	BHIWANI	21.24	24.19	-2.95
3	FARIDABAD	6.42	18.57	-12.15
4	FATEHABAD	10.48	29.78	-19.30
5	GURGAON	6.64	26.88	-20.24
6	HISSAR	15.47	8.08	7.39
7	JIND	11.97	14.33	-2.36
8	JHAJJAR	6.32	5.24	1.08
9	K.KSHETRA	9.27	39.11	-29.84
10	KAITHAL	6.28	29.33	-23.05
11	KARNAL	5.72	19.13	-13.41
12	M.GARH	16.11	48.54	-32.43
13	MEWAT	5.50	11.33	-5.83
14	PALWAL	5.37	11.09	-5.72
15	PANIPAT	4.56	21.17	-16.61
16	PANCHKULA	7.58	17.63	-10.05
17	ROHTAK	6.64	4.22	2.42
18	REWARI	11.75	27.31	-15.56
19	SONEPAT	4.68	10.23	-5.55
20	SIRSA	17.88	20.71	-2.83
21	Y.NAGAR	6.26	12.70	-6.44
	TOTAL	9.19	19.57	-10.38

DISTRICTS IN RED
FATEHABAD
GURUGRAM
K. KSHETRA
KAITHAL
KARNAL
M. GARH
PANIPAT
REWARI

Source: Ground water cell Haryana

Creation of a Water Budgets for Sustainability

1. This is an accounting tool of available water resources and various uses at the GP level.
2. The purpose of the water budget is to assess surface and groundwater resources and identify current and future needs as a basis for planning.
3. The water budget will be prepared by the GP with the help of the DPMU and SPMU.
4. The water budget document will be updated on a regular basis (preferably season-wise, but at least every year).

Source: http://jalshakti-dowr.gov.in/sites/default/files/Atal_Bhujal_Yojana_Program_Guidelines_Ver_1.pdf

6 Key Components of a Water Budgets for GP

1. Basic data of the area of Intervention like population, No. of households, no. of villages, No. of wards etc.
2. Domestic and drinking water demands for human consumption
3. Livestock, institutional demands
4. Current draft/use for agriculture and other purposes, with current sources and their yield potential
5. Gap analysis of demand and supply
6. Equity & sustainability

Source: http://jalshakti-dowr.gov.in/sites/default/files/Atal_Bhujal_Yojana_Program_Guidelines_Ver_1.pdf

Creation of a Water Security Plan for Sustainability

This is a plan that specifies investments and actions to meet water demands of a community in a specific GP, tailored to meet the particular challenges in the GP, and includes any water-related investments/actions to ensure optimum utilization of surface and groundwater available in the GP to serve their needs and needs to be finally approved by the Gram Sabha.

Source: http://jalshakti-dowr.gov.in/sites/default/files/Atal_Bhujal_Yojana_Program_Guidelines_Ver_1.pdf

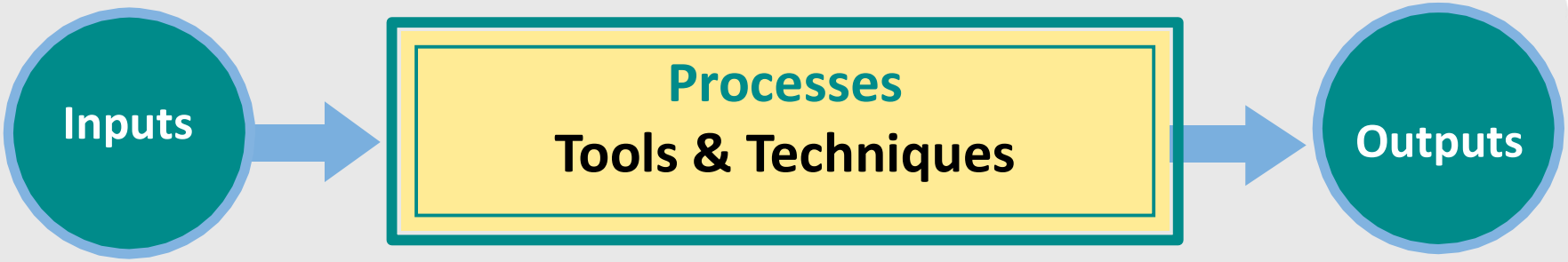
Preparation of Water Security Plan

COMMUNITY-LED WATER SECURITY PLANS

1. Orientation of community on the objective of Atal Bhujal Yojana
2. Initiating the process of preparation of Water Security Plans (WSP) through active engagement of Committee members
3. Regular meetings with the community for disclosure of data on water availability, utilization and balance in their GPs
4. Discussion and dialogue with the community on demand and supply side interventions to mitigate the decline in groundwater
5. Preparation of WSPs after incorporating community inputs
6. Approval of WSP by the committee and community

Source: http://jalshakti-dowr.gov.in/sites/default/files/Atal_Bhujal_Yojana_Program_Guidelines_Ver_1.pdf

WSP Phases : Expected Outputs



Activity Code	Phase	Expected Output
P	Phase 1: Preparatory Phase (P)	
P1	Institutional arrangement for DWSP	• Block-level institutional arrangement covering DWSM, BRC and SO, contact line department person for the water security plan to be put in place
P2	compilation of secondary data by District nodal officer	• DWSM approves secondary data for all GPs

Source: http://jalshakti-dowr.gov.in/sites/default/files/Atal_Bhujal_Yojana_Program_Guidelines_Ver_1.pdf

WSP Phases : Expected Outputs

Activity Code	Phase	Expected Output
C	Phase 2: capacity Building, Survey and Planning (c)	
C1	GP-level Mobilisation & convergence Meeting (GP-l-MCM)	• Agreed to participate • GP resolution to participate
C2	Gram Sabha (habitation-level Meeting)-1	• Gram Sabha resolution to participate
C3	Formation/strengthening of VWSC1	• List of VWSC members, VWSC bank account and Swacchatha Dooth selection
C4	Participatory rural appraisal (PRA)	• Social map • Resource map • Timeline & seasonality (water availability and diseases) • Community- Led Total Sanitation (CLTS) and development of sanitation plan

Source: http://jalshakti-dowr.gov.in/sites/default/files/Atal_Bhujal_Yojana_Program_Guidelines_Ver_1.pdf

WSP Phases : Expected Outputs

Activity Code	Phase	Expected Output
C	Phase 2: capacity Building, Survey and Planning (c)	
C5	Water transect—walk from source to users	• Identification of issues
C6	Establishment of rain gauge station	• At least one rain gauge station per GP, regular observation and recording of rainfall data
C7	WTQQ (WT- Water Table, Q -Quantity and Q Quality) monitoring of selected bore/tubewell	• WTQQ monitoring and recording of data of selected bore/tube well
C8	Water budget estimation	• As described earlier
C9	Women's meeting	• Awareness-raising and updating water budget and input for plans

Source: http://jalshakti-dowr.gov.in/sites/default/files/Atal_Bhujal_Yojana_Program_Guidelines_Ver_1.pdf

WSP Phases : Expected Outputs

Activity Code	Phase	Expected Output
C	Phase 2: capacity Building, Survey and Planning (c)	
C10	School-level programme	• Dissemination of information gathered during PRA and water budget • Developing school action plan for DWSP and sanitation
C11	Exposure visit—village implementing DWSP	• Learning DWSP plan and implementation, clarifying issues and constraints • Exchange of outcomes of water budget and DWSP plan
C12	VWSC- 2 Workshop—Water Security Plan Development	Moving towards water security planning • Technical • O&M management • Institutional
C13	Gram Sabha II	• Approval of DWSP
C14	GP-level compilation meeting (GP-2)	• Consolidation and approval of village DWSP

WSP Phases : Expected Outputs

Activity Code	Phase	Expected Output
I	Phase 3: Implementation Stage (I)	
I1	VWSC meeting • Details of works • Mode of implementation • Formation of Village Quality Assurance Team (VQAT)	• VQAT in place • Project components together with project cost is displayed in a prominent place
I2	Periodic joint review of works by VWSC, GP, PHE D, Zilla Parishad (ZP)	• Project progress and quality reviewed by the VWSC and VQAT
I3	O&M of existing scheme and drinking water conservation programme	• O&M initiated by VWSC • Water conservation programme implemented by VWSC • % reduction of water consumption and electricity demonstrated

Source: http://jalshakti-dowr.gov.in/sites/default/files/Atal_Bhujal_Yojana_Program_Guidelines_Ver_1.pdf

WSP Phases : Expected Outputs

Activity Code	Phase	Expected Output
M	Phase 4: Monitoring (M)	
M1	Monthly monitoring of WTQQ	• Water table, quality of drinking water source monitored and quantity of other sector analysed
M2	Survey to assess the number of individuals using toilets	• % increase in number compared to baseline data
M3	Water consumption survey for various sectors	• Sector-wide water consumption
M4	Media scanning	• Increased number of success stories and their dissemination at local, regional, national and international level

Source: http://jalshakti-dowr.gov.in/sites/default/files/Atal_Bhujal_Yojana_Program_Guidelines_Ver_1.pdf

Best Practices Across India in Irrigation




Source: www.cwc.gov.in

Case 2: Narmada (Sanchore), Rajasthan

Place of implementation: Rajasthan

Implementing agency: Govt. of Rajasthan

Best Practices Across India in Irrigation

Intervention

The use of micro irrigation technology like sprinkler and drip irrigation was made mandatory. Several initiatives that were taken up during the course were encouragement and enforcement of PIM (Participatory Irrigation Management) and formation of 2236 Water Users Association (WUA) for effective water management. Judicious usage of bio drainage in command area and tree plantation along the 1570 km length of canal was also taken up. Wide variety of salinity resistant crop for plantation was proposed. Steps were taken up for reduction of water allowance to handle drainage and salinity issues. Command Area Development and Water Management work were taken in tandem. The construction of canal network to utilize the full potential was created. Further steps like conjunctive ground water and surface water use has been proposed.

Achievements

The adoption of sprinkler irrigation system in place of conventional irrigation method resulted in numerous benefits. The Culturable Command Area (CCA) increased from 1.35 Lac hectares to 2.46 hectares with same quantity of water by adopting Sprinkler system in the entire project. There has been significant reduction in losses, both in cultivation and land loss. A comparatively high amount of efficiency is attained with automation and mechanization of the facility and irrigating structure. Outcomes of the irrigation intervention enabled extension of benefit from 89 villages to 233. Drinking water facility has also been provided in 1541 villages and three towns, which was not proposed earlier. The food production has increased from 534 cr. to 1480 cr. i.e. by 946 cr. (277%) based on year 2013-14. 20% of the area has been dedicated to growing Kharif crop in the modified project.

Takeaways

- Micro irrigation processes help in achieving high efficiency and reduces water use as in the conventional methods.
- Establishment of integrated irrigation system that comprises of canal systems, micro irrigation facilities and a network that even handles the problems of salinity, soil moisture, drainage etc.
- Conjunctive use of ground and surface water.

Source: www.cwc.gov.in

Source: Niti Aayog Best practice compendium

Best Practices Across India in Irrigation

Source: mowr.gov.in/

Case 3: Chittoor, Andhra Pradesh- Har Khet ko Paani

Place of implementation: Andhra Pradesh **Implementing agency: MoWR, RD & GR**

Best Practices Across India in Irrigation

Intervention

The steps taken up during intervention were renovation of traditional water structures and promotion of crop diversification. Under the program "**Har Khet Ko Pani**" comprehensive Repair, Renovation and Restoration (RRR) of all components in the chain of Tanks was carried out through extensive training of newly formed 610 WUAs and 1383 Community Based Organisations (CBOs). The State programme: "Neeru Pragathi" was also implemented and beneficial outcomes were seen during the course. Under More Crop per Drop, the advanced technologies were installed and the bore well mapping was done. By implementation of GIS based technologies like geo-tagging of assets the online application procedure was simplified. The highest priority was given to creating many water harvesting structures and SMC works under MGNREGS (Mahatma Gandhi National Rural Employment Guarantee Scheme). Other steps like incorporation of solar pumping methods, promotion of drip and sprinkler Micro- Irrigation(MI) techniques of irrigation and several other sustainable methods of modern day agriculture were also promoted.

Achievements

The impact of the intervention was remarkable as it sets benchmark and suggests several best practices for sustainable agriculture. Through this intervention, the irrigation potential was increased by 5,023 Ha, with increase in coverage under micro irrigation by 28, 324 Ha. Approximately 45,000 water harvesting structures have been created across the whole area in the district. These practices also led to a remarkable rise in water table at some points which was estimated as 32.37m to 10.15m. The increase in area under mulching with drip irrigation was 6000Ha and resulted in 60% water saving over the conventional method that were being followed. The concept of loop irrigation was also introduced in that area.

Takeaways

- Restoration and renovation of water bodies can lead to water use efficiency
- Optimal utilisation of the resources.
- Creation of WUAs helped in sustainability of the project.

Source: mowr.gov.in/

Source: Niti Aayog Best practice compendium

Best Practices Across India in Irrigation

Source: darpg.gov.in

Case 4: Mulching: Harvesting Many Benefits in Cardamom

Place of implementation: Western Ghats

Implementing agency: The Indian Cardamom Research Institute (ICRI)

Best Practices Across India in Irrigation

Intervention

Any material, usually organic, that is spread on the ground to protect the soil and the roots of plants from the effects of soil crusting, erosion, or freezing is known as a Mulch. A mulch may be made of materials such as straw, sawdust, grass clippings, peat moss, leaves, or paper etc. For large areas under cultivation a tilled layer of soil serves the purpose of a mulch but intensive cultivation of cardamom, ignoring the traditional cultural practices, has resulted in repeated losses. The Indian Cardamom Research Institute (ICRI) studied the soil fertility on a farm and found that the organic carbon/humus content is higher in the farms where this technique is practiced compared to neighbouring plantation. The soil bulk density is also very low. Mulching reduced the acidity of the soil and increased the soil moisture.

Achievements

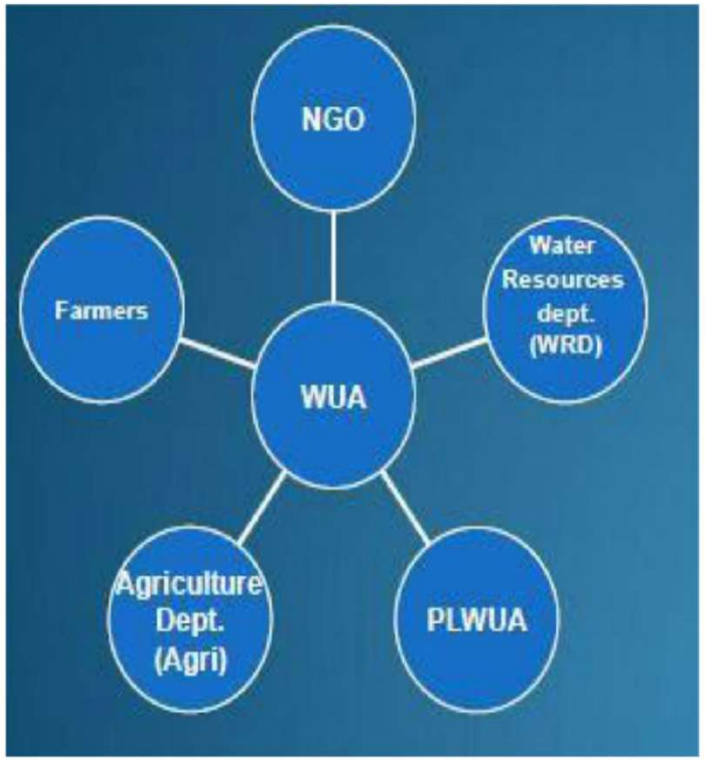
The studied showed significant achievements like high humus content on farm. It was observed that mulching resulted in several advantages- the plant growth is healthy and the damage due to thrips on capsules and stem borer is negligible; the height of the 17 year old plant is 15 – 20 feet tall and there are about 100 tillers in each clump. Usually cardamom fields are replanted with new suckers in 8-10 years of cultivation. But mulching helped in retaining the plantation successfully for 17 years with compact clumps. There is no need for weeding as the soil is not exposed and self- shade of cardamom clumps discourages weed growth.

Takeaways

- Mulching helps in conserving soil moisture
- It also acts as temperature regulator in hot summers and cold winters.
- Live mulching technique is very good for nitrogen fixation.
- Organic waste generated from field can fruitfully be utilised to reap significant benefits.
- Growth of unwanted weeds can be controlled in farm using this technique.

Source: www.thehindu.com/sci-tech/science/mulching

Best Practices Across India in Irrigation



Source: mowr.gov.in/

Case 5: Participatory Irrigation Management (PIM) - Waghad, Maharashtra

Place of implementation: Maharashtra **Implementing agency: MoWR**

Best Practices Across India in Irrigation

Intervention

The steps carried out during the intervention were awareness programs that promoted conjunctive use of surface and ground water and enforcement of water use entitlement which is monitored and regulated by Maharashtra Water Resources Regulatory Authority. Steps were taken up to achieve equitable distribution of the resources using the tail to head principle. As gender realisation and equal participation of both men and women is need of an hour thus during formation of WUA's equal and active participation of women was also encouraged. The integrated approach for participation of several stakeholders was done during the course of institution building. The farmers contributed 50 Lakh for rehabilitation cost and 15% cost of office building. Also formation of CMC for supervising rehabilitation works was also done.

Achievements

There was an improvement in water use efficiency and water productivity of irrigation projects through participation of farmers in irrigation management. WUAs were formed and the area covered by of entire project was around 10000 Ha. The overall irrigation area increased from 7885 Ha in 2004 to 9354 Ha in 2014-15. The water saving was 27%. In addition to this the drip irrigation coverage increased from 25% in 2004-05 to 40% in 2014-15 with approximately 100% recovery of water charges. The area saw an increase in average income from INR 60000 to INR 2, 92,139.

Takeaways

- Participatory approach can help is judicious use of resources
- Representation of an equitable percentage of women in formation and working of WUA's is highly important.
- Tail to head distribution of resources helps in achieving equity.
- Capital and labour contribution in building of an institutional structure gives a sense of ownership to the beneficiaries.

Source: mowr.gov.in/

Best Practices Across India in Irrigation

Source: ggrc.co.in/webui/home.aspx

Case 6: Micro-irrigation in Gujarat

Place of implementation: Gujarat

Implementing agency: Gujarat Green Revolution Company Ltd.

Best Practices Across India in Irrigation

Intervention

The intervention was an integrated approach to promote uniformity of provisions under various schemes to remove their inequalities and anomalies. The objective was establishment of a special purpose vehicle – Gujarat Green Revolution Company which would promote and implement Micro Irrigation Scheme in Gujarat. The initiative educated the farmers in adoption of scientific water management techniques and benefits of value-addition in crop production and marketing of their produces. The initiative embarked upon Jal Sanchay Abhiyan which is a drive for Storage of Water in which the Micro-Irrigation Scheme is an integral part of the programme. The Gujarat Green Revolution initiative also took care of providing electricity connections to approximately 1, 16,146 farmers on a priority basis who adopted Micro- Irrigation Systems on their agricultural lands.

Achievements

The intervention in true sense set a green revolution. From the time of implementation till 2014, a total number of 6, 40,853 farmers had adopted Micro Irrigation Systems (MIS) in a total area of 10, 34,930 Ha and were able to reap out on the benefits of the program. In many tribal areas, 1, 31,293 farmers adopted Micro-Irrigation System over a cumulative area of 1, 78,745 Ha. Out of the total area of 10,34,930 Ha covered under the Micro-Irrigation Scheme, 4,96,305 Ha has been covered under Drip Irrigation and 5,38,625 Ha under Sprinkler Irrigation. Gujarat has achieved double digit growth in agriculture sector and the state is a pioneer of second green revolution in the country. Farmers' earnings have increased due to progressive agriculture policies of the state government.

Takeaways

- This model sets as a benchmark that could be implemented across nation.
- Strict monitoring and dedicated agencies played a crucial role in making the programme a success.
- Effective storage and management of water is equally important as is the availability.

Source: ggrc.co.in/webui/home.aspx

Source: Niti Aayog Best practice compendium

Best Practices Across India in Irrigation

Source: https://www.cechyd.org/

Case 7 : Root Zone Watering by SWAR (System of Water for Agriculture Rejuvenation)

Place of implementation: Hyderabad **Implementing agency: Centre for Environment Concerns**

Best Practices Across India in Irrigation

Intervention

The intervention was carried out by the Hyderabad-based Centre for Environment Concerns (CEC). The intervention discovered a unique irrigation technology called System of Water for Agriculture Rejuvenation (SWAR). The innovative SWAR system attained a global recognitions and awards. SWAR shifts irrigation from surface to measure moisture at plant root zone. Soil moisture content in the root-zone is an important variable in modelling hydrological and biophysical processes and agricultural applications and SWAR works on these parameters. The root zone also serves as an ecosystem to foster soil micro-organisms besides rationing plant water requirements. The system involves storing of water in overhead tanks and sending it through a small diameter pipe to a customised locally-made clay pot that is buried near the root area. The clay pot contains micro-tubes that transmit water through a sand pouch, to prevent the roots from invading the pipes and the pot. The slow oozing of water provides moisture for a prolonged period, the level of which is calculated based on soil type, plant species and its age. SWAR uses a very less amount of water and there is zero wastage of water.

Achievements

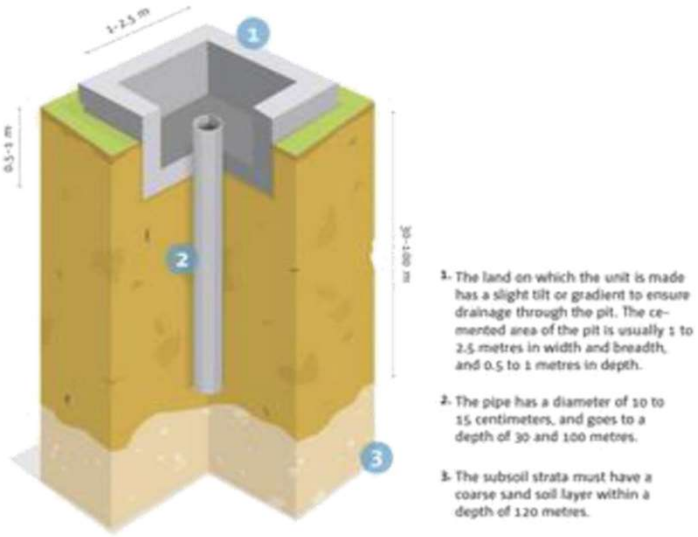
The innovation has been highly recognised by the Andhra Pradesh government. The government has placed orders for implementation of the system in an extent of 400 acres in Anantapur, Kurnool and Chittoor. The system is suitable for the massive tree plantation programme. In 2015, this technique was also used to grow vegetables and flowers. This helped show immediate results in terms of both soil and plant health and farmers' incomes. In vegetables and fruits, where close planting is done, it was discovered that one eighth of the water suffices, compared to drip irrigation. It was due to these promising early results that SWAR received the Global Champion Innovation Prize for Water and Forestry at the 2015 Paris International Agricultural Show. SWAR, desires to bring more low rainfall areas under irrigation.

Takeaways

- It is important to shift from rain dependent farming to harvesting and storing rain water and using it efficiently to cultivate crops.
- It is important to use water optimally providing moisture rather than 'concentrated' loads of water.
- Heathy farming practices should be adopted for soil improvement.
- Agricultural innovations should be sustainable and offer improved incomes to smallholder farmers.

Source: securingwaterforfood.org

Best Practices Across India in Irrigation



Source: http://www.naireetaservices.com/

Case 8: Bhungroo – Ground Water Injection Well

Location of Implementation: Gujarat **Implementation Agency: Govt. of Gujarat**

Best Practices Across India in Irrigation

Intervention

'Bhungroo' is a water management system that injects and stores excess rainfall water underground. This water is then used for irrigation during summers .The intervention was carried out in sites identified by the Gram Panchayat through resistivity surveys by the Ground Water Department and Geologists from DWMA (District Water Management Agency) for this purpose. Design and estimation was done under MGNREGS. The pilot project was carried out in Gujarat with user groups. The steps such as installation of one unit with sub-surface storage at three levels between 25 to 110 feet with a total capacity of 2 crore litres was implemented. The farmers were trained in installation of Bhungroos. Installation of piezometer was done for water level monitoring on a day-to- day basis.

Achievements

Artificially recharging of aquifers by adding rainwater to underground water reservoirs enables the communities to continue farming for more than half of the year. The non-saline rainwater when mixed with the underground saline water brings down the salinity of the groundwater, making it fit for agricultural use. The system also enables one to lift up and use the stored water during dry spells. The massive underground reservoir can hold as much as 40 million litres of rain water. It harvests water for about 10 days per year and can supply water for as long as seven months. These wells can hold up to two crore litre of rain water.

Takeaways

- Major beneficiaries of this pilot program were the underprivileged female farmers who were completely depended upon rain fed agriculture.
- This system has reduced drudgery of women thus making them the chief owner and expert of this practice.
- It provides food security and sustainable livelihoods to more than 18,000 marginal farmers (with over 96,000 dependent family).
- It has helped in contributing to food security. .
- This technique can be replicated in other parts of country for groundwater recharge.

Source: http://www.naireetaservices.com/

Best Practices Across India in drinking water

Source: http://www.wasmo.org/showpage.aspx?contentid=72

Case 1: Community managed drinking water supply program, Gujarat

Place of implementation: Gujarat

Implementing agency: Water and Sanitation Management Organization (WASMO)

Best Practices Across India in drinking water

Intervention

A community managed, demand-driven, decentralized approach for rural water supply program was implemented at village level as an initiative to provide adequate and safe water supply to village community. It then brings together the community through Pani Samitis, NGOs, and International organizations like UNICEF, WASH and World Bank along with technical assistance from WASMO to ensure equitable availability of safe drinking water to the community. The villages covered by this drive have been connected to the piped water supply network, overhead storage tanks have been built in villages and drinking water supply is being administered with community participation.

Achievements

The initiative serves as a sustainable system of providing clean water to rural households and has established a financially sustainable model for water provision. Around 76.84% of rural households in Gujarat have been covered under this intervention as of 2014. Significant improvement has been observed in the community, especially for girls, to continue their education instead of fetching water from long distances, reduction in water borne diseases, overall improvement in health status and better living standards of the community. Pani Samitis have been formed in 18,185 out of 18,478 villages in the State, apart from formation of water quality teams in 16,860 villages, distribution of field test kits in 14,216 villages and fixing and collection of water tariffs by 7,131 villages.

Takeaways

- Collaboration with communities and use of maximum use of existing infrastructure ensures adequate, regular, safe, sustainable and convenient water supply at household level.
- Engagement of communities in the implementation process reduces the need for government support, makes the program self-reliant and ensures social sustainability.

Source: http://www.wasmo.org/showpage.aspx?contentid=72
WASMO and One World Foundation India, 2014

Best Practices Across India in drinking water

Source: http://www.undp.org/content/dam/india/docs/good_practices_in_water_security_ideas_for_praxis.pdf

Case 2: Jal Dal- Children's Institutions for Water Management

Place of implementation: Barmer **Implementing agency: Jal Bhagirathi Foundation, Rajasthan**

Best Practices Across India in drinking water

Intervention

Due to lack of availability of drinking water, Government School in Godawas experienced poor enrolment and attendance rates. Children had to help their mothers fetch water from distant places and were at the suffering end of the problem of water access. The Gram Panchayat of the village constructed a 40,000 liter tank in school, enlargement of village pond and created a Jal Sabha in the village. To ensure maintenance of the newly constructed tank, a student body of 10 members called Jal Dal was constituted. The Jal Dal took the responsibility of cleaning the roof and ensuring clean water in the tank. They were also responsible for cleaning of silt chambers and meticulous functioning of the hand pump. The school children were also involved in environment conservation drives and in disseminating information about water stress to the villagers. This is an ongoing practice which is passed down to the younger students to maintain the tank. The students have also started a piggy bank in which students from higher classes contribute one rupee per month for maintenance of tank and purchased of water during times of scanty rainfall.

Achievement

This intervention has positively impacted education in the region and has yielded a growth in literacy rate. There has been a noticeable fall in the school dropout rate and attendance has become more consistent. Incidences of water borne diseases have reduced, clean water is available throughout the year for the village. The village has become self-reliant and is now no longer dependent on pricey water tanks run by mafia to fulfil their water requirements.

Takeaway

- The Jal Dals provide an excellent example of volunteerism and community service, enabling children to learn about water management practices through hands on experiences
- It also puts forward an instance of uniting the school administration and students to work together to ensure that every child gets access to clean water and right to education.
- Community driven initiatives are better maintained and demonstrate longevity in terms of resource management.

Source: http://www.undp.org/content/dam/india/docs/good_practices_in_water_security_ideas_for_praxis.pdf

Best Practices in Traditional knowledge

Source: http://www.ecotippingpoints.org/our-stories/indepth/india-rajasthan-rainwater-harvest-restoration-groundwater-johad.html

Case 1: Johads in Haryana, Uttar Pradesh and the Thar Desert of Rajasthan

Best Practices in Traditional knowledge

Johads

Johads are simple mud and rubble barriers built across the contour of a slope to arrest rainwater. It is one of the oldest systems used to conserve and recharge ground water. Johads collect monsoon water, which slowly seeps in to recharge groundwater. As the maximum rainfall is around monsoon season thus the rainfall during July and August is stored in Johads and used in coming months. Sometimes, many Johads are interconnected with a gulley or deep channels with a single outlet in a river or stream nearby to prevent structural damage. These earthen check dams are meant to catch and conserve rainwater, leading to improved percolation and groundwater recharge and maintain soil moisture. Acts as source of water for drinking purpose by humans and cattle. Are called as "khadins" in Jaisalmer and tanks in most parts of the country.

Initiatives

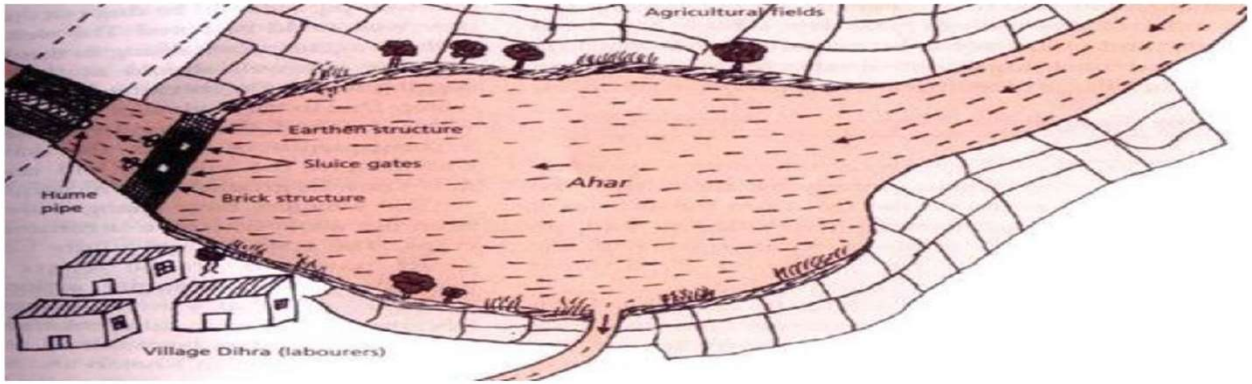
Several initiatives have been taken up by government of India in conserving and promoting Johads Irrigation Department of Haryana spent INR435.26 crore (INR4.3 billion or US$7 million) to renovate and restore water bodies in the state to for conservation of water, recharging of ground water, preservation of environment and enhancement of tourism. In 2016, Government of Haryana announced a plan to map the district-wise map of water flow and to create a database of all water bodies within the state. During the drought of 1985-86 in Alwar district in Rajasthan volunteers from the Tarun Bharat Sangh (TBS), came to Alwar and since then over 5000+ Johads have been thrived all over Rajasthan significant results have been seen in improvement of the water table level in those areas.

Takeaways

- Johads have always been a point of release of social energy.
- Results in increased water availability and acts as a resource to agriculture, animal husbandry etc.
- Acts as a protection of forests and green cover in catchments.
- Positive impact on education and health
- Decline in distress migration
- Requires constant and timely maintenance which in turns motivates several stake holders and government to invest in and raise their quality of work

Source: http://www.rainwaterharvesting.org/rural/traditional1.htm
http://www.ecotippingpoints.org/our-stories/indepth/india-rajasthan-rainwater-harvest-restoration-groundwater-johad.html

Best Practices in Traditional knowledge



Sources: http://mwrd.bih.nic.in/Proposed%20Schemes.htm
http://www.cpreecenvis.nic.in/Database/AharPyne-TraditionalfloodwaterharvestingsysteminSouthBihar_3810.aspx

Case 2 : Ahar Pyne : Bihar

Best Practices in Traditional knowledge

Ahar Pyne

It is an indigenous irrigation practice in South Bihar. Ahar is a rectangular embankment type water harvesting structure - embanked on three sides & fourth side being the natural gradient of land- also used to grow Rabi Crops. Pyne are the irrigation channels. In south Bihar, the terrain has a natural slope. And the soil morphology is like of a sandy soil thus water does not retain for a longer time. The Groundwater levels are comparatively low. Rivers in this region swell only during the monsoon to a huge extent, but the water is swiftly carried away or percolates down into the sand. Thus for this region floodwater harvesting the best option here, to which this system is admirably suited. The Water supply comes from natural drainage after rainfall or through Pynes. The water for irrigation is drawn out by opening outlets made at different heights in the embankment. The Water is mostly used for cultivation of paddy.

Initiatives

As due to modernization and lack of convergence between old systems, new system and development of new irrigation techniques and abolishment of the Zamindari there has been a decrease in the adoption and usage of this system. Though some villages in Bihar have taken up the initiative to re-build and re-use this system for storage and agriculture. One such village is Dihra in southwest of Patna city. In 1995, the villagers realized the waters of the Pachuhuan could be impounded (a seasonal stream passing through the village that falls into the nearby river Punpun) and use its bed as a reservoir to meet the village's irrigation needs. Initiative were taken up and funds were collected and work began that resulted in a successful system.

Takeaways

- It is a cheap source of water for irrigation.
- Requires a Collective action and community participation and distribution of responsibility, earlier was looked after by three functionaries- the headman, the supervisor (Barahill) and the watchman (Gudait).
- Repair and maintenance needs to be a continuous process.
- In the earlier institutional system the major responsibility and central control were with the landlords and the amount spent on it was realized under Gilandazi (improvement of irrigation works)
- Minor responsibilities were distributed amongst cultivators like de-silting and cleaning.

Source: http://nopr.niscair.res.in/bitstream/123456789/13855/1/IJTK%2011%282%29%20266-272.pdf

Best Practices in Traditional knowledge

Source: http://www.cpreecenvis.nic.in/Database/ApataniFarmingSystem_3788.aspx

Case 3 : Apatani - Arunachal Pradesh

Best Practices in Traditional knowledge

Apatani

It is a wet rice cultivation cum fish farming system practiced by Apatani Tribes of Ziro in lower Subansiri district of Arunachal Pradesh. This area receives and average annual rainfall of 1700mm. This system harvests both rainwater and surface water which is simultaneously used for irrigation and pisciculture. In this method water from small streams and springs is tapped by creating temporary mud walls that acts as barriers and provide storage. They also acts as flow regulators ad helps in diverting the flow towards the required area in the terraces and vicinity of agriculture the land in valley. As the system uses the rainwater and surface water flowing along the slope. The water tapped at the hill top is mixed with the organic waste and passed across the village through small channels. Terraced plots at distance of 0.6m is created along with earthen dam and bamboo frames which helps in regulating and diverting the flow. The local drainage system is merged with the irrigation system which, in turn, improves the nutrient content of water required for rice cultivation. Thus the organic way of agriculture is followed.

Initiatives

Apatani tribe is unique for its history and its traditions. They follow a unique agricultural practices where the intention is the maximum utilization of resources. They utilize land available for agriculture very judiciously for cultivation, even the agricultural plot bunds are used for millet cultivation, the water utilization is highly organic and optimal to the best level. The Apatani are known for the meticulous care they take of their agricultural fields. The tribe is rich and high in cultural values with highly enrooted practices through which they take care of the agricultural land. After transplantation of paddy seedlings three cycles of weeding is repeated to ensure a weed-free field and healthy crop. The Apatani have had an intricate irrigation system along with fish rearing the waste produced also acts as manure to the field. Though this combined practice is relatively modern and was introduced in the 80s with great success. This practice is unique to Arunachal Pradesh the practice is highly sustainable and marks as a great practice that could be adopted in several regions of the country.

Takeaways

- The land gives sustained yield year after year.
- The economic and energy efficiency of this agro-ecosystem is exceptionally high and rice is exported after meeting local needs.

Source: http://www.rainwaterharvesting.org/rural/Traditional3.htm
http://www.niscair.res.in/sciencecommunication/researchjournals/rejour/ijtk/Fulltextsearch/2005/January%202005/IJTK-Vol%204(1)-January%202005-pp%2065-71.htm
http://www.cpreec.org/pubbook-traditional.htm

Best Practices in Watershed management




Source: http://www.anandana.org/Project-bhujal.html

Case 1: Project Bhujal: Watershed Rejuvenation

Place of implementation: Bundelkhand **Implementing agency: Anandana**

Best Practices in Watershed management

Intervention

The Bundelkhand region of central India is the hotspot of water scarcity. Degraded lands, poverty stricken area along with inefficient institutional structures for health and education have just worsen the situation. This has led to a poor socio economic condition of the whole region. The region of intervention, Parasai-Sindh watershed of Jhansi district, comprises of three villages and covers nearly 1,250ha land. From 2012, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) along with local community has successfully implemented watershed interventions in this area. The steps taken up were the construction of 6 check dams and 15 farm ponds, renovation of 60 existing structures, recharging of 100 wells along with contouring in 8 locations.

Achievements

Project Bhujal along with project Jalnidhi and project Unnati has created a remarkable impact in areas of Bundelkhand. Project Bhujal specifically aimed in rejuvenating the watershed and it created a storage capacity of 100 million liters of water. After this intervention the cropping intensity increased up to 30% and there was a significant increase the ground water recorded up to 2 to 5 meters. Around 100 acres of land was made cultivable resulting in extra source of income up to Rs.20,000 per acre for the farmers of the area. The framework included development of essential infrastructure, the labor was mostly generated from within the community thus gave a huge scope of employment. The community was also encouraged for effective utilization of resources. Regular public interaction platform was developed in which there was equal representation of women, men and all the stakeholder groups which provided a platform for discussion and suggestions and gave a fare and transparent evaluation of the intervention.

Takeaway

- Significant improvement in level of water resources can be achieved with collective efforts.
- The solution of problem often emerges from within the system but an effective transparent institution is required.
- It is important to train each individual and ask for their collective efforts thus giving them a sense of belongingness to the intervention.
- NGOs and CSR should work for collective good of the people and set benchmarks for future interventions.

Source: http://www.anandana.org/Project-bhujal.html

Best Practices in Watershed management




Source: http://tarunbharatsangh.in/wp-content/uploads/2013/06/25years.pdf

Case 2: Tarun Bharat Sangh

Place of implementation: Kishori-Bhikampura

Implementing agency: Tarun Bharat Sangh Alwar Rajasthan

Best Practices in Watershed management

Intervention

The first intervention by TBS was undertaken in Kishori village and subsequently the success story was repeated in other villages. The main objective of the intervention carried out was building and rejuvenation of Johads, which is a traditional rainwater storage tank in Rajasthan. They focused upon programs for community management and village swaraj. Till today, they have constructed over 10,000 johads in Rajasthan. Through community participation and management recharge structures and rain water storage structures were created. Supervisory groups were formed to look after proper operation and maintenance and desilting. The remarkable transformation wrought by the efforts of TBS is most apparent in Alwar district, particularly in the villages of Bhaonta-Kolyala.

Achievements

TBS has achieved remarkable improvements and progress in the interventions they carried out. Till date they have around constructed and restored 10,000+ water storage structures that serves thousands of people. About 750 villages spread over 6,500 sq kms have benefited from the water harvesting techniques introduced by the Tarun Bharat Sangh and have successfully mitigated their vulnerability to the severities of drought. In corporation to this collective actions were carried out through which measures were taken up for forest conservation thus giving rise to formation of a gram sabha as an institution for sustainability of the project. Farmers have also taken up several measures and changes in their agricultural practices thus making it more sustainable. For community upliftment work, TBS has attained several national recognitions and has set an example at global level.

Takeaway

- This kind of intervention and community participation reflects the strength in collective actions and also a framework to develop around the future interventions and policies.
- Apart from just rejuvenation of watershed land and forest conservation is also equally important.
- Interventions should increase the scope for all round development of the area and scope employment for the marginal people.
- TBS has set a best example of integration of modern and traditional techniques of conservation.

Source: 25 years of evolution, Tarun Bharat Sangh, http://tarunbharatsangh.in/wp-content/uploads/2013/06/25years.pdf

Best Practices in Agriculture for Atal bhujal Haryana

Wheat Cultivation through Zero Tillage Machine with Integrated Pest & Nutrient Management (IPNM).

Sugarcane Cultivation through Broad Bed Furrow (BBF) method with Drip irrigation System.

Establishment of Vermicompost Unit for the preparation of qualitative vermicompost.

Source: http://jalshakti-dowr.gov.in/sites/default/files/Atal_Bhujal_Yojana_Program_Guidelines_Ver_1.pdf

Best Practices in Agriculture for Atal bhujal Haryana

Promotion of Agroforestry (Block/Bund Fruits/Timber Plantation).

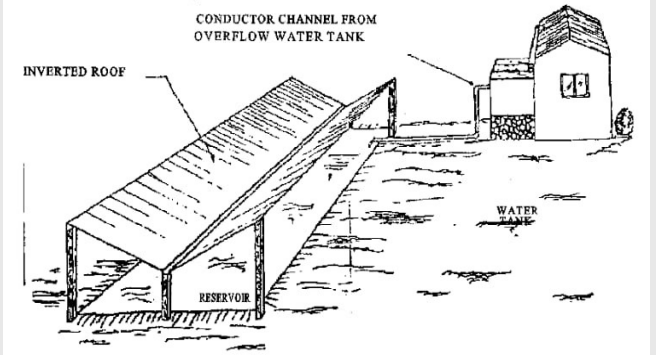
Promotion of -SWAR (System of Water for Agriculture Rejuvenation) Drip System under vegetable & orchards at Rainfed Areas.

Afforestation through Miyawaki Method.

Source: http://jalshakti-dowr.gov.in/sites/default/files/Atal_Bhujal_Yojana_Program_Guidelines_Ver_1.pdf

Best Practices in Agriculture for Atal Bhujal Haryana

Paddy Cultivation through DSR (Direct Seeded of Rice) Method



In situ water harvesting: recharge pits, farm ponds, etc.

Micro Irrigation and crop diversification

Source: http://jalshakti-dowr.gov.in/sites/default/files/Atal_Bhujal_Yojana_Program_Guidelines_Ver_1.pdf


Source: https://www.akdn.org/

ATAL BHUJAL YOJANA (ATAL JAL)
Ministry of Jal Shakti
Department of Water Resources, River Development & Ganga Rejuvenation

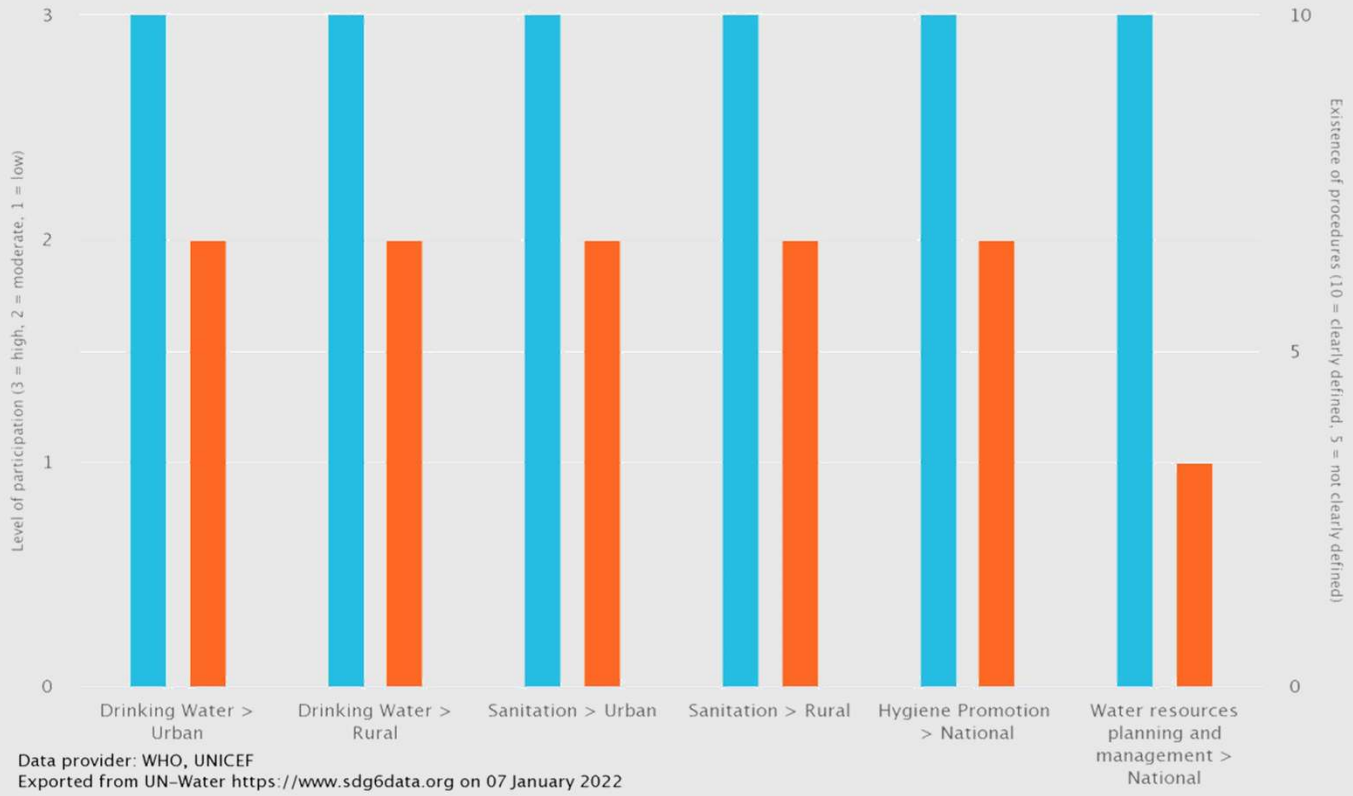
Community Engagement & IEC in Water Resource Management

Session - 4

Why Community Participation in Managing Water is NECESSARY?

As Water is the source of all forms of life and this necessity emerged from a long history of trial and error in the water supply sector particularly in the rural areas.

Population Usage and Participation in Safely Managed Drinking Water Services – SDG6 Data



Source: https://www.sdg6data.org/country-or-area/India#anchor_6.b.1

System Strengthening and Social Accountability

01 Empowering the community leading to enhanced participation

02 Engaging community members to manage and operation

03 Making the system functional due to continuous monitoring

04 Hence marking strengthening of system thereby making the community accountable in the advent of service delivery.

Community mobilization, futuristic village leadership & ownership over Atal bhujal assets

Community Mobilization

‘Jan Andolan’ (people’s movement)

1. Participatory rural appraisal (PRA) tools
2. IEC/ BCC activities
3. Capacity development
4. Training

Ownership over assets

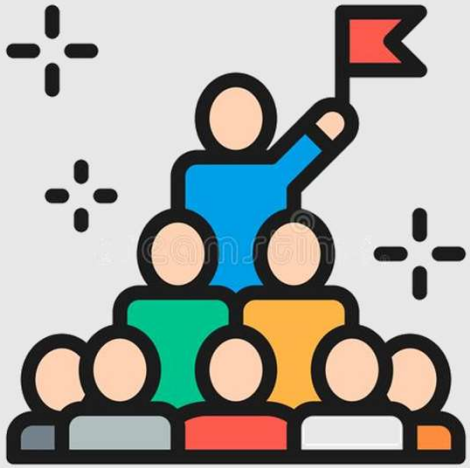
'sense of ownership' among the local community and 'willingness to pay' for services.

'For long-term drinking water security, it is important that local communities and GPs come forward and **take responsibility to manage in-village water supply systems and their water resources; and reuse greywater**. The community must have a sense of ownership of the assets being created under this Mission.'

- Hon'ble Prime Minister

Futuristic Village Leadership

As leader of the GP, a few important duties of the Sarpanch are as follows



1. Convening **Gram Sabha meetings regularly**
2. Presenting the selection process of VWSC/Pani Samiti members in the Gram Sabha ensuring 50% women representation and comprising of Panchayat members, ASHA workers representation from SC/ ST and underprivileged households.
3. Ensuring **transparent resolution** of all the issues discussed
4. Ensuring that all sections of the community receive **equal water supply for all.**
5. **Mobilising the villagers** for community contribution towards capital cost of water supply scheme,
6. **Resolve all issues and challenges** in close coordination with PHED, Forest Department and other departments

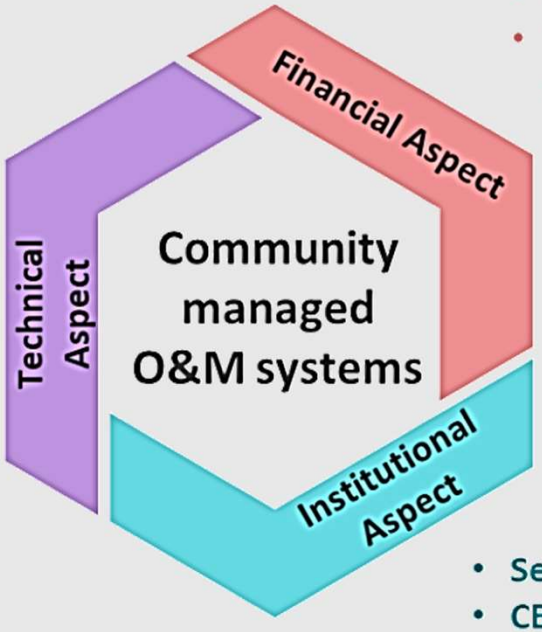
Involvement of women as primary stakeholder as leader

1. Presence of women as a critical mass helps in inclusion of actual felt needs of **women in decision making**
2. Ensure greater participation of women in Gram Sabha meeting to **facilitate inclusion of women's** needs in development planning and decision making
3. For ensuring and **promoting gender mainstreaming** in development planning, implementation and inclusion of gender specific needs
4. Studies have validated that **women-headed Panchayats have brought about a shift in the development** agenda,
5. Create conducive environment for enabling opportunities of **strengthening women's role** under Har Ghar Jal programme

Community managed O&M systems

A. Daily Operation
- Daily operation from source to FHTC
- Water quality management
- Liquid waste management

B. Maintenance and repair
- Preventive maintenance
- Periodic maintenance
- Breakdown maintenance



- O&M expenditure
- O&M revenue
- Other sources of funds for O&M
- Water tariff structuring and collection

- Set up O&M systems
- CB and IEC
- Record keeping and maintenance
- Complaint redressal

Technical Aspect of O&M

Daily Operations

1. Operation of pumps,
2. Storage tanks,
3. The distribution system including pipelines and valves,
4. Tap stands (posts),
5. Water quality management, documentation,
6. Liquid waste management, etc.

Regular maintenance and repairs

Purpose of regular maintenance is to see that all civil works machinery and are in optimal running condition and to carry out timely repairs

Liquid waste management

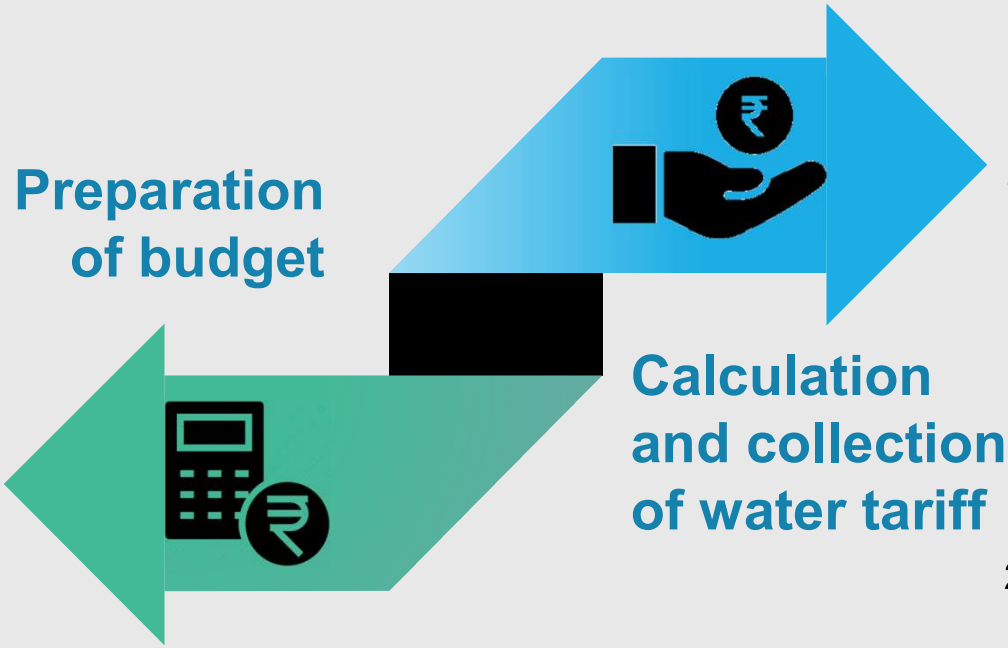
Improper wastewater management poses risks to water quality and will indicate suboptimal maintenance of the scheme.

Water quality management

Monitor water quality at the source and in the system on a regular basis and regularly disinfect water using TCL powder or on-line chlorination systems.

Financial Aspect of O&M

1. VWSC and Gram Panchayat along with the community have to prepare the budget for their O&M
2. sources of revenue are GP own source funds, voluntary contributions, user charges, 15th FC funds, funds through convergence
3. Calculation of various expenditure components



1. Based on the annual requirement, Gram Panchayat and/ or its sub-committee along with local community can collectively discuss and fix an amount per household as water user charge which would be paid every month.
2. The amount can be fixed on volumetric consumption, where metering is available.

Institutional Aspect of O&M

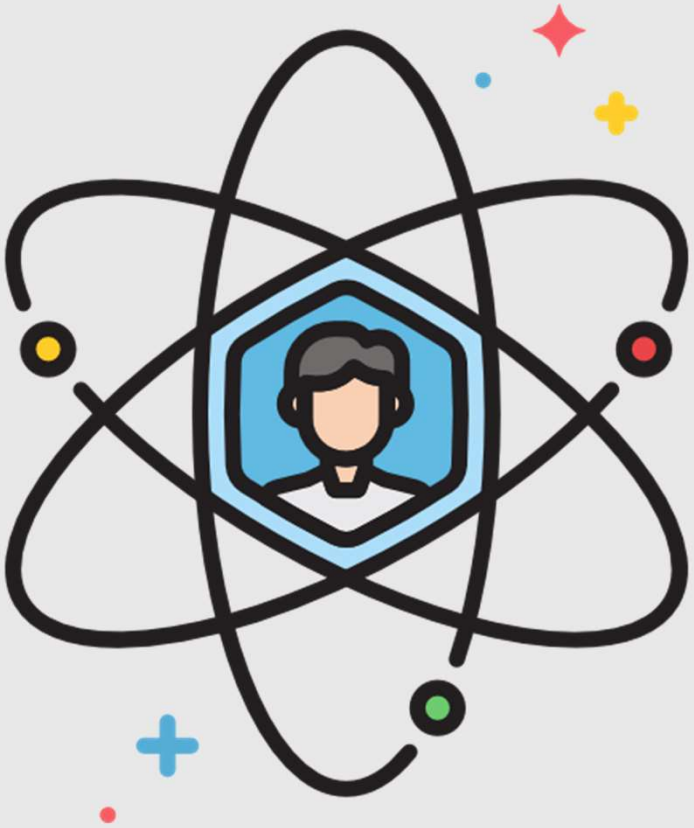
Hiring O&M service through contractor/SHGs

Distribution of Work and Responsibilities
Complaint redressal

Complaint redressal

Record Keeping

Local skill development for implementation and O&M of drinking water systems



1. **District-wise requirement of skilled human resource need to be identified** and their training will have to be taken up on priority through PMKVK
2. Proper training **manual in local vernacular language** is to be prepared
3. skilled human resource will be **encouraged to become rural entrepreneurs**

Resource Mapping

What?

It focuses on the natural resources in the village and depicts hills, rivers, water sources, forests, fields, vegetation, geographic strata, scope for water recharge and storage measures, etc.

Why?

To understand the available resources in the village including hills, rivers, water sources, forests, fields, vegetation, geographic strata, scope for water recharge and storage measures, etc.

Process for Resource Mapping

Before

1. Brief information of the tool to the village community
2. Decide the location (open space) and materials for drawing maps

During

1. Mark the village boundary and direction.
2. Make the villagers to draw topographical map
3. Make the process more effective and inclusive.
4. Ensure inclusion of all groups (women and marginalised groups)
5. Discuss issues and challenges

After

1. Ensure that the map drawn on paper covers all the marked resources
2. Take photograph of social map.

Water Source Mapping

What?

Water source mapping and scheme transect is an effective tool for assessment of water supply facilities from source to mouth.

Why?

- To gather information about season wise availability of water sources and present status of various scheme components through assessment of source to mouth journey.
- To create an opportunity to discuss about the problems associated with sources, scheme components and proposed feasible solutions to deal with the problems
- Identify potential locations for water supply facilities considering the topography
- To trigger the villagers for actions by bringing forth the status of water supply

Process for Water Source Mapping

Before

1. plan a visit the sources and system components one by one.
2. Ensure participation of water person (Jalsurakshak)

During

1. Assess the existing water supply facilities available in the village
2. Assessment of surface and ground water through checklist
3. Assess the piped water supply scheme from source to individual connection
4. ensure inclusion of all groups
5. Record the finding during the assessment process

After

1. Discuss the issues addressed through checklist along with the villagers and the possible solutions
2. Identify potential options for sources and storage structures.

Plan for IEC/ BCC activities

Objective

i. **Create awareness and motivate people** to take affirmative action for protection of drinking water sources, safe handling of drinking water

ii. Create awareness and motivate people to **conserve water resources**

iii. **Trigger behavior change** among individuals, families and communities to adopt improved health and hygiene practices

iv. Create awareness and demand for **community participation**

v. **Create an enabling environment** through strengthened coordination, effective advocacy with media and critical stakeholders

vi. **Promote personal accountability and responsibility** for ensuring provision of safe drinking water to all

Target Group

Following target groups should be kept in view while planning the campaign:

I.) **Primary Target Group :** creating awareness, raising the profile of issues and involving people in solving them - rural community, school going children and youth, Panchayat members and village elders/community leaders

ii.) **Secondary Target Group :** Other important stakeholders and influencers (programme managers, district officials, etc.)

Suggested IEC

Mass Media

i. "Audio-Visual spots" shown on TV

ii. "Audio Spots/Jingles" broadcast through radio.

iii. Street theatre to promote desirable behavior through kala j street plays, folk songs etc.

iv. Talk shows, panel discussions and expert lectures on r issues on national and regional channels

Suggested IEC

Print Media

i. Advertising in regional paper sand magazines

ii. Development of concept for advertorials and daily updates

iii. Coverage of events, success stories in regional newspapers

iv. Development and supply of brochures, pamphlets, leaflets, etc. highlighting the initiatives taken up by schemes, technologies, sources available at all levels,

Suggested IEC

Activities at School and Anganwadi level with involvement of students

i. Development of School Kit that includes behaviour posters, leaflet for children and parents, leaflet for teachers and hand washing poster;

ii. Organizing State level essay and elocution competitions on health and hygiene among school children;

iii. Plan for awareness generation through rallies, padyatras, etc.; and

iv. Involvement of NSS, NSC, Scouts and Nehru Yuvak Kendras (NYKs)

Suggested IEC

Advocacy and Networking

i. Media Communication workshop with eminent journalists from print & electronic media;

ii. Sensitization workshops for journalists from print and electronic media; and

iii. Sensitization workshops with Radio jockeys and programme production managers from Government Radio Channels.

Outdoor Publicity- Development and supply of hoardings and banners in public gathering places

Source: http://www.spain-india.org/

Best Practices and Group work

Session - 5

Case Study 1: Pani Panchayat, Orissa

- Project Name : Water Resource Consolidation Project
- Implementing agency : Department of Water Resources
  Orissa Intervention

- Pani Panchayat, a water-user collective.
- The Orissa Farmers Management Irrigation Act of 2002 provides for the establishment of farmers organizations in all the irrigation systems, for their operation and maintenance.
- It has been subsequently amended in 2008

Source: http://www.dowrorissa.gov.in/Citizen/PIM/PIM.htm

Pani Panchayat : Role of Pani Panchayats Orissa

1. To assist the Revenue and Disaster Management Department in the preparation of demand and collection of water rates except EC aided projects and L.I projects where the farmers collect water tax among themselves.
2. To resolve the disputes, if any, between the members and water users in its area of operation and to raise resources.
3. To regulate the use of water among the various pipe outlets under its area of its operation

4. To prepare cropping programme considering the soil and agro climatic condition with due regards to crop diversification.
5. To promote economy in the use of water allotted.
6. To prepare a plan for the maintenance of irrigation system in the area of its operation at the end of the each crop season and carry out the maintenance works with the funds of the Pani Panchayats from time to time.

Sourcehttp://www.dowrorissa.gov.in/Citizen/PIM/PIM.htm

Pani Panchayat : Key Takeaways Orissa

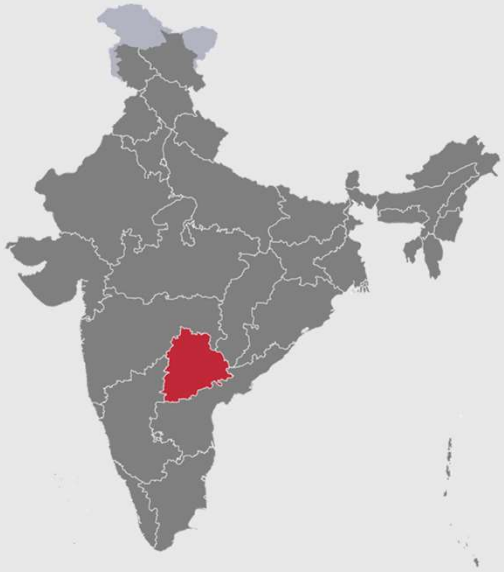
- ✓ Bottom-up institutional framework helps in sustained and effective management of the resource.
- ✓ Capacity development helps in continual improvement of the office bearers
- ✓ The success stories published in the quarterly journal "Krushak Bandhu Arnapurna" Published helps in exchange of knowledge with larger audience.

Source: http://www.dowrorissa.gov.in/Citizen/PIM/PIM.htm

Case Study 2: Mission Kakatiya, Telangana

- Implementing agency : Telangana State Government

- Mission Kakatiya is a flagship program under Telangana government aimed at restoring minor irrigation sources of water like ponds and tanks.
- The objective of Mission Kakatiya is to enhance the development of agriculture based income for small and marginal farmers through sustainable irrigation resources.
- This is to be done by accelerating the development of MI infrastructure, strengthening community based irrigation management, adopting a comprehensive programme for restoration of tanks.



Source: http://missionkakatiya.cgg.gov.in/

Mission Kakatiya: Role Telangana

1. Silt Removal & Silt Application
2. Restoration of Feeder Channel to the tank (Part of chain of tanks)
3. Repairs to Bund , Weir & Sluices
4. Re-sectioning of Irrigation Channels & Repairs to CM & CD works.
5. Raising of FTL, wherever possible/necessary.

Component of Restoration of the tanks

Source: : http://missionkakatiya.cgg.gov.in/

Pani Panchayat : Key Takeaways Orissa

- ✓ Provide **sustainability** to existing ground water resources.
- ✓ Public participation and encouragement for the **use of local resources** helps in increasing economic feasibility of any intervention.
- ✓ **Healthy practices for socio-economic upliftment** are necessary for any sustainable intervention
- ✓ Restoration and maintenance of **water resources should be a continual process** and local people should be trained to manage their resources.

Source: http://missionkakatiya.cgg.gov.in/

Atal Bhujal Yojana Haryana: Case Study

- **Case Study 1 : GP – Teharki, block Palwal, Dist Palwal**

- **Title : An attempt to increase irrigated area through micro irrigation instead of flood irrigation.**
- **Category: Agriculture**

- **Background:** Palwal is located in the southern part of Haryana and the western part of India, being a part of the National Capital Region. It shares a geographical boundary with Mewat, Aligarh, Gurgaon, Faridabad and Delhi. National Highway – 2 passes through the Palwal district. Apart from the perennial river Yamuna flowing, a 136 km long Kundli – Manesar – Palwal Expressway is being planned to run through the district.
- **Climate:** During the summer months of April (latter half), May, June and July, the temperature is 36 deg C on an average. During the rainy months, majorly in August, the rainfall peaks to 184 mm and temperature is 22 deg C on an average.

Source: Atal Bhujal Yojana Haryana

Atal Bhujal Yojana Haryana: Case Study

- **Challenges:**

- Due to the Geographical and climate conditions, particularly the canal irrigation is not possible because of normally Irrigation canal are used on the "Free Flooding Method of Irrigation" by virtue of canals.
- Since last 20 to 30 years it became the biggest challenge to provide irrigation water to each and every land holding of the district.
- When increasing availability of irrigation water is becoming too costly, up to the year 2020 there was no scheme which supports the farmers to use sprinklers, drip and water carrying pipes equipment's by offering subsidies.

- **Initiative:**

- After the launch of Atal Bhujal Yojana in the state, the projects related to implementation of sprinkler, drip on subsidy, to farmers , were approved by the VWSC under Atal Bhujal Yojana.

Source: Atal Bhujal Yojana Haryana

Atal Bhujal Yojana Haryana: Case Study

- **Key Result/ Insight /Interesting Facts:**

- All these component sprinklers, drip and water carrying pipes has been increased tremendously by the same availability of irrigation water and their sources.
- An awareness camp was organized in every gram panchayats for adaptation of water efficient practice for increasing cost efficient ratio by DIP/DPMU team with farmers regularly. The whole system has been made totally transparent and subsidy is also being given through DBT process.

- **Impact:**

- It is under stood that this best adaptation practice is extremely useful, not only to have the judicious use of available irrigation water but also to minimize the wastage of water through flood irrigation method.
- It is presumed that if 5cm water is required for a crop in flood irrigation and 2cm water is required for sprinkler or drip irrigation, than total irrigation efficiency will be increased by 2 to 2.5 times. This increased area can produce 2 to 2.5 times of previous production and thereby increased income to the farmers.

Source: Atal Bhujal Yojana Haryana

Atal Bhujal Yojana Haryana: Case Study

- **Case Study 2 : GP – Mahrampur, Block Narnaul, District Mahendragarh.**

- **Title :** The irrigation department of Mahendragarh district has tried to connect the canal to the village pond for ground water recharge.
- **Category:** Agriculture and Livestock
- **Background:** Mahrampur Gram Panchayat is located in Narnaul Block of Mahendragarh.

- **Challenges:**
  - Due to over-exploitation of groundwater from generation to generation, the level of groundwater has gone down considerably, due to which the villagers and farmers are facing ground water crisis.
  - There is a river in the villages which is known as Dohan river which is a rainy river and due to lack of rain, most of the river's pool remains dry.

Source: Atal Bhujal Yojana Haryana

Atal Bhujal Yojana Haryana: Case Study

- **Initiative:**

  - Under the Atal Bhujal Yojana, the irrigation department of Mahendragarh district has tried to connect the canal to the village pond for ground water recharge. There is a gap of three kilometres between the canal and the river. The place where the river water is released into the pond is called Dochana Distributary and after the water comes into the pond, when the pond is completely filled, then the access water is released into the river bed.

- **Impact:**

  - According to the villagers, due to the linking of the canal with the river, there has been a significant increase in the ground water level, as well as the availability of water for agriculture and livestock. This work has been done through incentive amount under Atal Bhujal Yojana.

Source: Atal Bhujal Yojana Haryana

Atal Bhujal Yojana Haryana: Case Study

- **Case Study 3 : GP – Nangal Kalia, Block Nangal Chaudhary, District Mahendragarh.**

- **Title :** Ground water has increased through connecting the river with the canal.
- **Category:** Agriculture and Livestock

- **Background:** Nangal Kalia village is located in Nangal Chaudhary block of Mahendragarh district
- **Challenges:**

  - In Nangal kalia village ground water level is very low. Due to less water, farmers have shifted their traditional crops to less water consuming crops, as well as sprinklers are also being used in large quantities in agriculture. Due to the fall in the ground water level, the wells have dried up and the water level in the bore well has gone down, due to which the amount of total dissolved solids in the water is increasing, which is affecting the health of the people and also the crops. Due to this people have to depend on canal water. Krishnavati River, which is the main river, has also dried up, due to which many people are moving in the direction of migration. There is a river in the villages which is known as Dohan river which is a rainy river and due to lack of rain, most of the river's pool remains dry.

Source: Atal Bhujal Yojana Haryana

Atal Bhujal Yojana Haryana: Case Study

- **Initiative:**

  - Village water security plan was prepared by the team of Atal Bhujal Yojna under Atal Bhujal Yojna with the suggestion of the villagers, in which the proposal of connecting the river with the canal was made by the villagers and farmers, in which this proposal was approved by the Irrigation Department.

- **Impact:**

  - At present, the canal water is being released every 15 days into Krishnavati river bed from Naulpur distributary in Nangal Kalia village, due to which the amount of ground water has increased significantly in the surrounding area, according to the local people.

Source: Atal Bhujal Yojana Haryana

Group Work, Presentation and Discussions

Session - 5

Recap of previous session.

Form 2 Groups:

1. Underlying possible challenges in community mobilization and participation.

2. Figure out the ways to mitigate those challenges to manage the water resources efficiently.

Feedback and Final Remarks

Session - 6

Recap of Previous Session

Question: What are the key components of rural water resource management?

- Planning.
- Fund flow.
- Community mobilization.
- Implementation.
- Operation and management.

Group Work

Groups to be formed around each component to prepare an integrated water resource management plan for a Village/Gram Panchayat.

After the group work, each group will present their worksheets.

The group points will then be combined to prepare an IWRM.

Session end break…

Open for Discussion

Scan the QR code to provide the Feedback

or go to https://forms.gle/x9sDZwDtKKZwE8QK9

Thank You

Founded in 1926

on behalf of

All India Institute of Local Self Government

Address

All India Institute of Local Self Government,
22, 23, D Block, Pankha Rd, D Block,
Janakpuri Institutional Area, Janakpuri, New Delhi, Delhi 110058

Website:

www.aiilsg.org