HYBRID TRAINING ETIQUETTE DO'S AND DON'TS

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ATAL BHUJAL YOJANA

Sustainable Ground Water Resource Management

Module 1 Recap

The following was covered

01 Understand the components of Atal Bhujal Yojana and sustainable ground water management

02 A Broader Overview on Groundwater Management Interventions, Planning & operations

03 Application of IoT & technology for Underground water system

04 Convergence of Ongoing government schemes and missions with Atal Bhujal Yojana

05 Participatory planning & development of mass communication strategies for ABhY

Learning Duration- 4 Hours

Training Programme

Introductory

Module Overview

The following will be covered

01 Institutional Strengthening under Atal Bhujal

02 Supply side & Demand side interventions - more detail

03 Leadership Development in sustainable groundwater management

04 Good Governance and Skilling & Employment Generation for implementing ABhY

05 Convergence of Schemes by integration and collaboration of Line Departments

Session Overview

SL. No.	Session no	Topic	Sub Topic	Time (in Min)
1	Session 1	**Institutional Strengthening under Atal Bhujal**	How to strengthen the groundwater governance mechanism in the states	10 mins
			Incentive component rewarding/the states for various measures aimed at ensuring the long-term sustainability of groundwater resources.	20 mins
			Sustainable management of Groundwater	20 mins
			District wise adopted & recommended strategies for Implementation	10 mins
2	Session 2	**Strengthening Institutional Framework for Participatory Groundwater Management**	Supply Side Engineering in Haryana	25 mins
			Demand Side Interventions in Haryana	25 mins
BREAK				15 mins
3	Session 3	**Leadership Development in sustainable groundwater management**	Assessment of Resources, Macro policy adjustments and Policy/political dialogue on land-use	15 mins
			Reducing pumping energy subsidies, tuning crop guarantee prices & Use measurement and reduction	15 mins
			Regulatory Provisions and Community Participation	15 mins
LUNCH BREAK				45 mins

Session Overview

SL. No.	Session no	Topic	Sub Topic	Time (in Min)
4	Session 4	Good Governance and Skilling & Employment Generation for implementing ABhY	Principles of Good Governance & allocation of responsibilities with a Governance model	15 mins
			Existing situation , Groundwater Governance Mechanisms	20 mins
			Gender Inclusion in Good Governance mechanism	10 min
Tea Break				10mins
5	Session 5	Convergence of Institutions and Missions	Process and Benefits of Convergence	15 min
			Convergence with various schemes	15 min
			Convergence between different Institutions in Haryana	15 min
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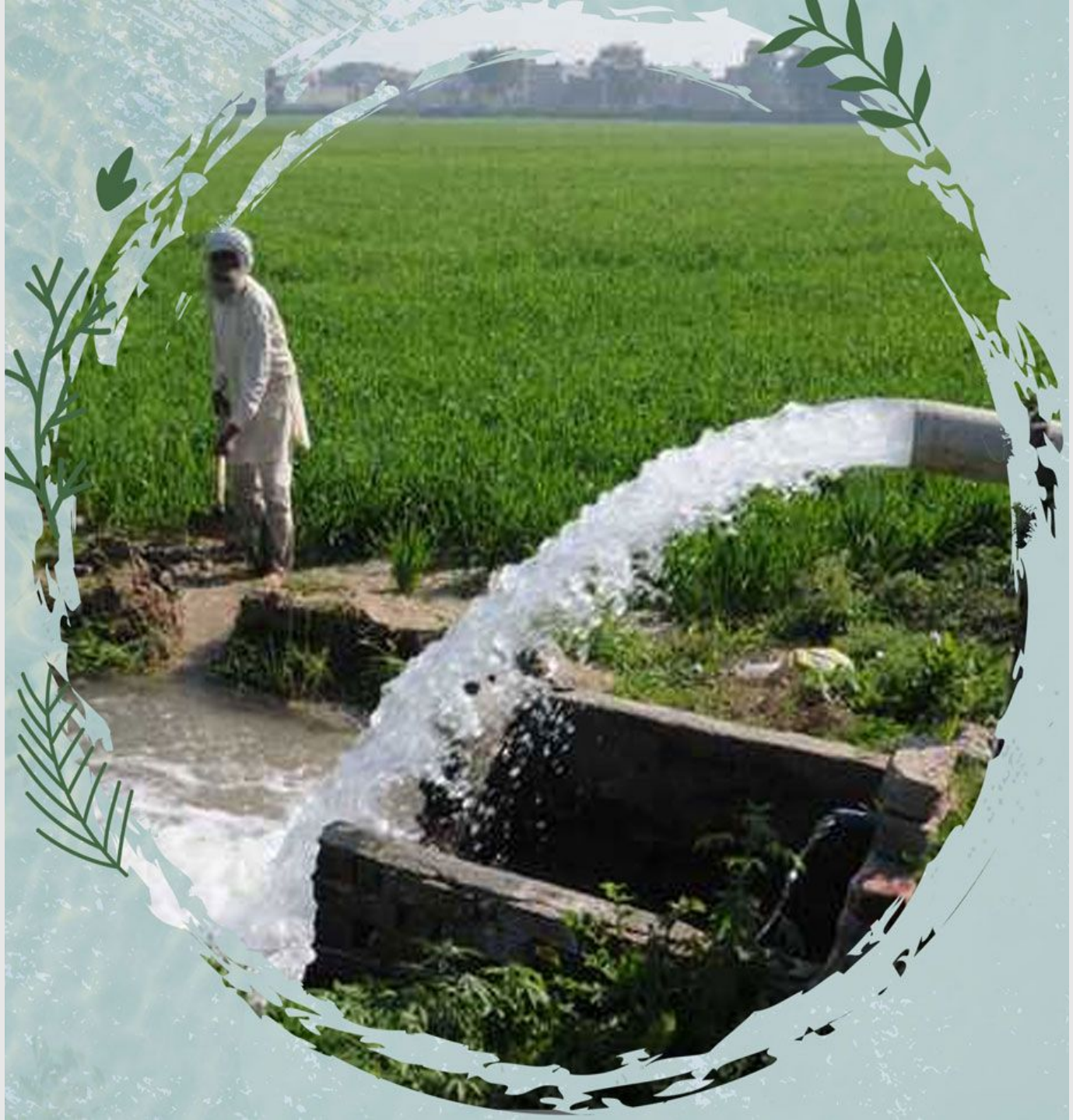
			End note	10 mins

Learning Objectives

- Institutional Strengthening and Sustainable management of Groundwater
- Demand and Supply side interventions adopted in Haryana
- Leadership Development for participatory groundwater management
- Good Governance mechanism and Gender Inclusion for implementation of Atal Bhujal Yojana
- Convergence between different institutions and other schemes

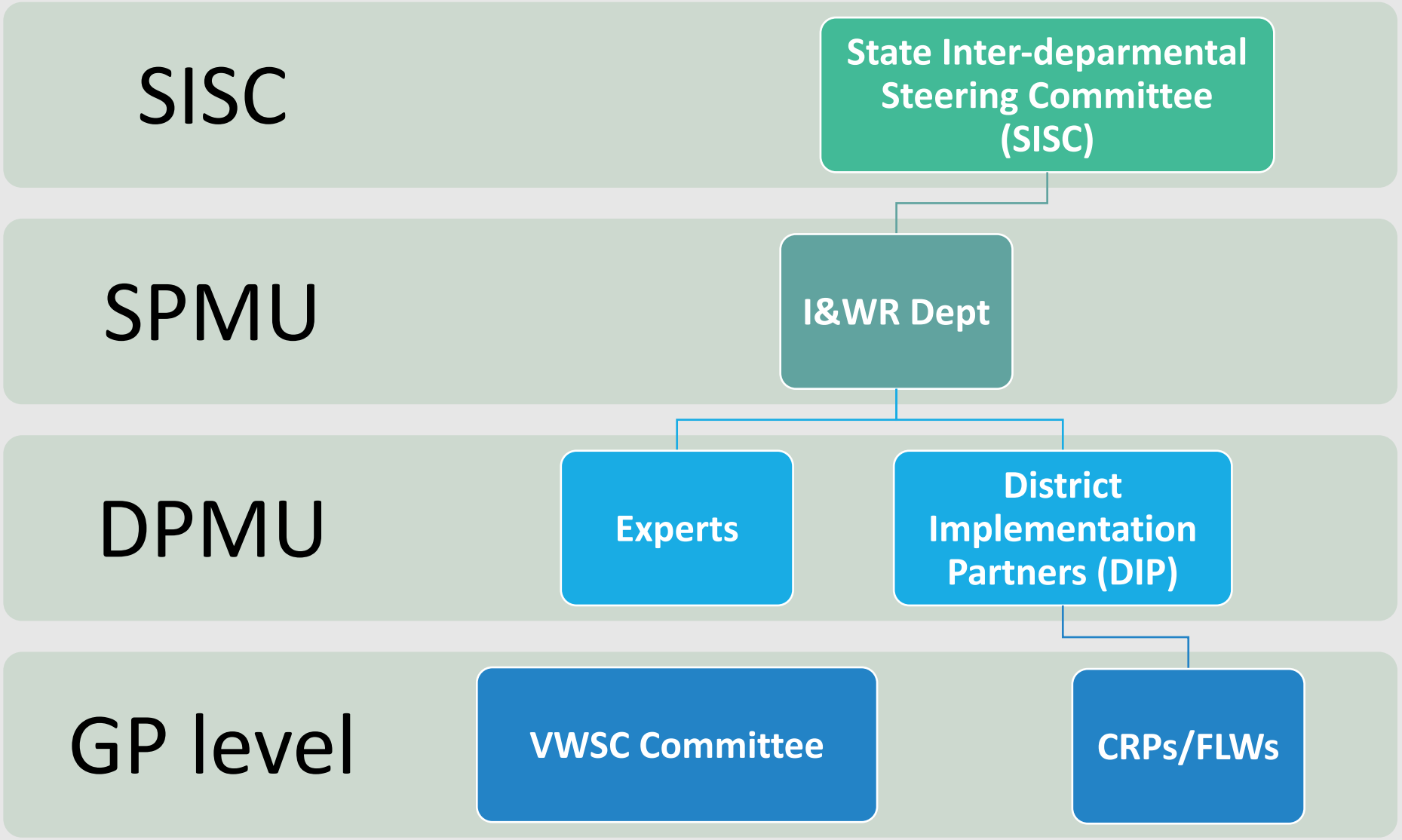


ATAL BHUJAL YOJANA (ATAL JAL)
Ministry of Jal Shakti
Department of Water Resources,
River Development &
Ganga Rejuvenation

Institutional Strengthening under Atal Bhujal Yojana

Session - 1

Institutional Arrangement under Atal Bhujal



Source: https://hid.gov.in/

Institutional Strengthening

- ✔ Institutional strengthening/ development to aid collaborative behaviours and system optimisation
- ✔ Building Social Capital
- ✔ Bottom up approach **#Behaviour** found purposeful **#Organisations** created to promote the behavours **#Institutions** are created to promote organisations
- ✔ Top down approach-reverse
- Institutional Framework
- Process of Institutionlization

Strengthening the Groundwater Governance Mechanism

Groundwater governance refers to the **policies, regulations, and management practices that govern the use, protection, and conservation of groundwater resources.**

Establish clear policies and regulations

Develop monitoring and data management systems

Promote sustainable use of groundwater resources

Implement effective enforcement mechanisms

Encourage stakeholder participation

Strengthen institutional capacity

Source:-https://www.mdpi.com/2073-4441/8/8/347

Institutional Strengthening of Panchayats

The Minister while introducing Constitutional Amendment Bill in Parliament on December1, 1992, the then Rural Development Minister said

" this castes a duty on the centre as well as the states to establish and nourish the village so as to make them effective self-governing institutions" .

In this they would achieve **Gram Swaraj**

- From Unit to Institution
- ISG plus 11th Schedule . **What is ISG?**
  - ✔Institutional Existence- decisions
  - ✔Institutional Capacity- rule making ,etc.
  - ✔Financial Viability - adequate funds, raising powers, etc.

Or

Triple Fs. Functions, Finance & Functionaries

- ✔ Imparted certainty, continuity and Strength

Process of Institutionalization

Role and functions of Panchayati Raj Institutions (PRIs)

Functions of Panchayat

1

Preparation of annual development plan of panchayat area, annual budget, relief in natural calamities, removal of encroachment, etc.

2

Selection of beneficiaries through Gram Sabhas, public distribution system, non-conventional energy source, improved Chullahs, biogas plants have also been given to Gram Panchayats in some states.

3

The optional functions depend on the resources of the panchayats.

4

The civic functions relating to sanitation, cleaning of public roads, minor irrigation, public toilets and lavatories, primary health care, vaccination, the supply of drinking water, constructing public wells, etc..

Source: https://www.civilsdaily.com/panchayati-raj-institution-evolution-features-composition-powers-functions

Role and functions of Panchayati Raj Institutions (PRIs)

Functions of Panchayat Samiti

1. Some functions are entrusted to them like agriculture, land improvement, watershed development, social and farm forestry, technical and vocational education, etc.

2. Implementation of some specific plans, schemes or programmes to which funds are earmarked.

3. They are headed by Block Development Officers (B.D.Os).

4. Panchayat Samitis are at the hub of developmental activities

Source: https://www.civilsdaily.com/panchayati-raj-institution-evolution-features-composition-powers-functions

Role and functions of Panchayati Raj Institutions (PRIs)

Functions of Zila Parishad

1. undertakes schemes to improve agricultural production, exploit ground water resources, extend rural electrification and distribution and initiate employment generating activities, construct roads and other public works.
2. performs welfare functions like relief during natural calamities and scarcity, the establishment of orphanages and poor homes, night shelters, the welfare of women and children, etc.
3. perform functions entrusted to them under the Central and State Government sponsored programmes.
4. Zila Parishad looks after development works in the entire district.
5. prepares district plans and integrates Samiti plans into district plans for submission to the State Government.
6. coordinates their activities and supervises their functioning.
7. Zila Parishad links Panchayat Samitis within the district.

Source: https://www.civilsdaily.com/panchayati-raj-institution-evolution-features-composition-powers-functions

Strengthening Panchayati Raj Institutions

- A **separate functional domain for panchayats should be created** with adequate fund and personals to discharge them.
- **Exclusively functional jurisdiction of action** for each level of panchayats.
- Devolution within the **framework of cooperative federalism** means transfer of individual activities of a subject between state and local government and within the local government between GP, AP and ZP.
- Role of **community participation to be strengthened**
- Panchayat plan is in nature **a holistic plan covering and integrating multiple sectors.**
- Any **sectoral plan should be a sub plan** of the panchayat plan.
- **A vision document for the district** by the District Planning Committee in consultation.
- **Grants to panchayats should be untied** so that panchayats can decide their own priorities.

Strengthening Institutional Capacity to ensure Women and men benefit equitably

Institutional commitment to promote gender-sensitive working conditions for laborers	Institutional awareness and capacities to promote gender equality.	Vocational training and skills development under the Community Infrastructure Fund.	Construction of community halls.
• Mandating equal wages for equal value of work.	• The project management unit (PMU) should include dedicated staff positions for community development and social and gender equality.	• Vocation training according to the funds to be provided to men and women both increase involvement of women	• Space should be provided for public participation, cultural programs, and cultural exchange.

Source:- https://www.adb.org/sites/default/files/publication/160696/gender-mainstreaming-ind-urban-water.pdf

Incentive Component for various measures

Groundwater recharge	• The recharge can be through measures such as **rainwater harvesting, construction of artificial recharge structures, and use of treated wastewater for recharge.**
Water conservation	• States that promote water conservation measures such as the **adoption of efficient irrigation technologies, water reuse and recycling, and efficient household water use** could be rewarded.
Groundwater monitoring	• States that establish **robust groundwater monitoring systems to track the quantity and quality of groundwater resources** could be rewarded.
Regulation of groundwater use	• This can include measures such as **restricting groundwater use in water-stressed areas and imposing penalties for over-extraction of groundwater**.
Public awareness and participation	• This can include measures such as **organizing public education campaigns and involving local communities in decision-making processes related to groundwater management.**

Source:-https://jalshakti-dowr.gov.in/atal-bhujal-yojana/

Some Principles for Sustainable Groundwater Management

- Integral framework for all waters: surface, ground, rain, storm runoff, saline, treated effluents
- Two different roles of water use: for life, for production
- Quantity and quality must be considered jointly
- Demand side management is at least as important as supply side, often more, in agriculture, urban and industrial uses
- Environmental quality must be rehabilitated and sustained
- Social equity in water and sanitation services and pricing in participatory planning

Source: https://slideplayer.com/slide/1520794/

Sustainable Management of Groundwater

1. GROUNDWATER MONITORING:

Regular monitoring of groundwater levels, quality, and usage is essential to ensure that the resource is being used sustainably. This info. can be used to identify potential issues and develop effective management strategies.

2. ALLOCATION OF GROUNDWATER:

Groundwater needs to be allocated in a way that is sustainable, equitable, and transparent. This may involve establishing rules and regulations for the use of groundwater, such as setting limits on the amount of water that can be extracted.

3. GROUNDWATER CONSERVATION:

Practices that conserve groundwater, such as using water-efficient technologies and practices, can help to reduce demand and preserve the resource.

4. STAKEHOLDER ENGAGEMENT:

Engaging with stakeholders, such as local communities, water users, and industry, is critical to ensure that management strategies are effective and meet the needs of all parties.

5. GROUNDWATER PROTECTION:

Protecting groundwater from contamination by pollutants and other harmful substances is essential to maintain its quality and ensure that it can be used for drinking, agriculture, and other uses.

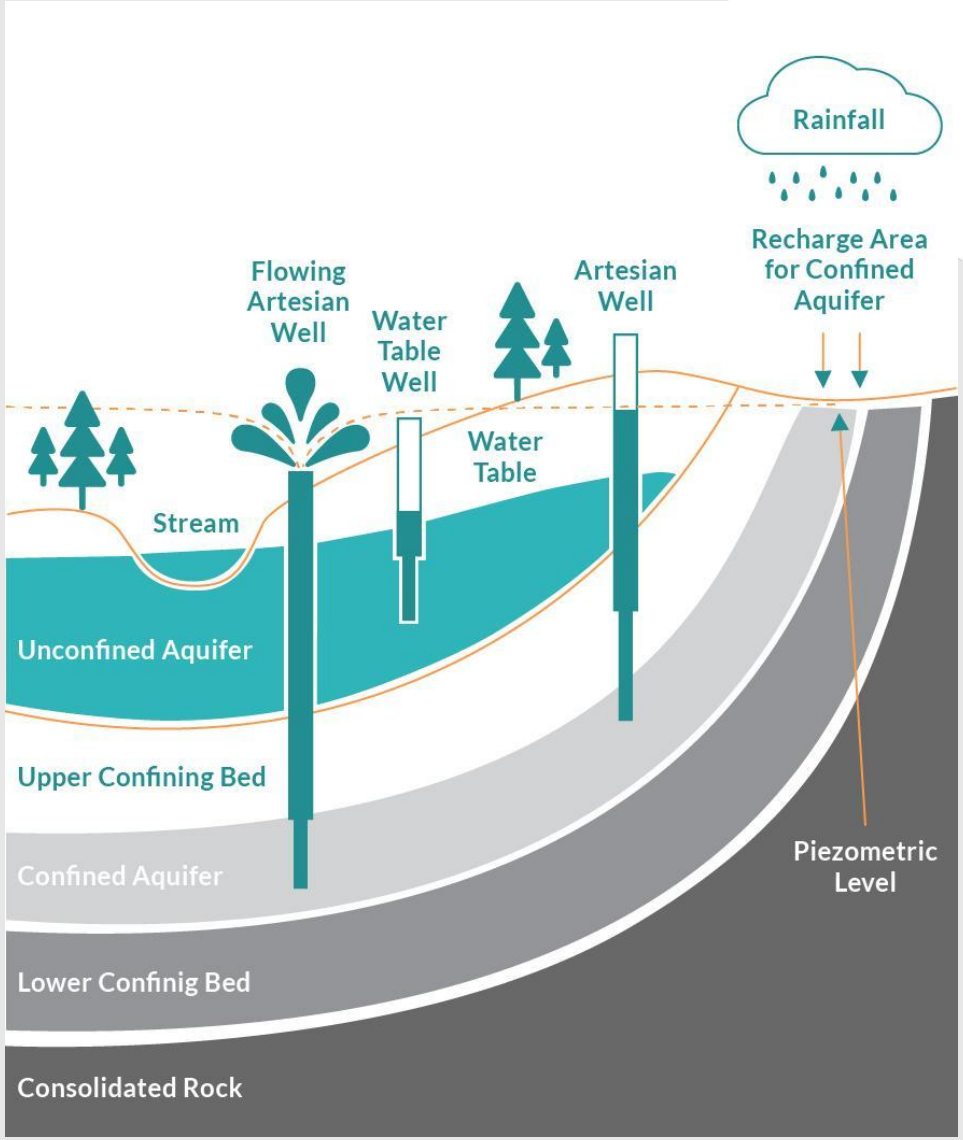
6. GROUNDWATER RECHARGE:

Recharging groundwater through practices such as infiltration basins, rainwater harvesting, and land use changes can help to replenish depleted aquifers.

Source: http://cgwb.gov.in/documents/papers/incidpapers/paper%201-b.m.jha.pdf

Aquifer Mapping & Management for Sustainable Groundwater Management

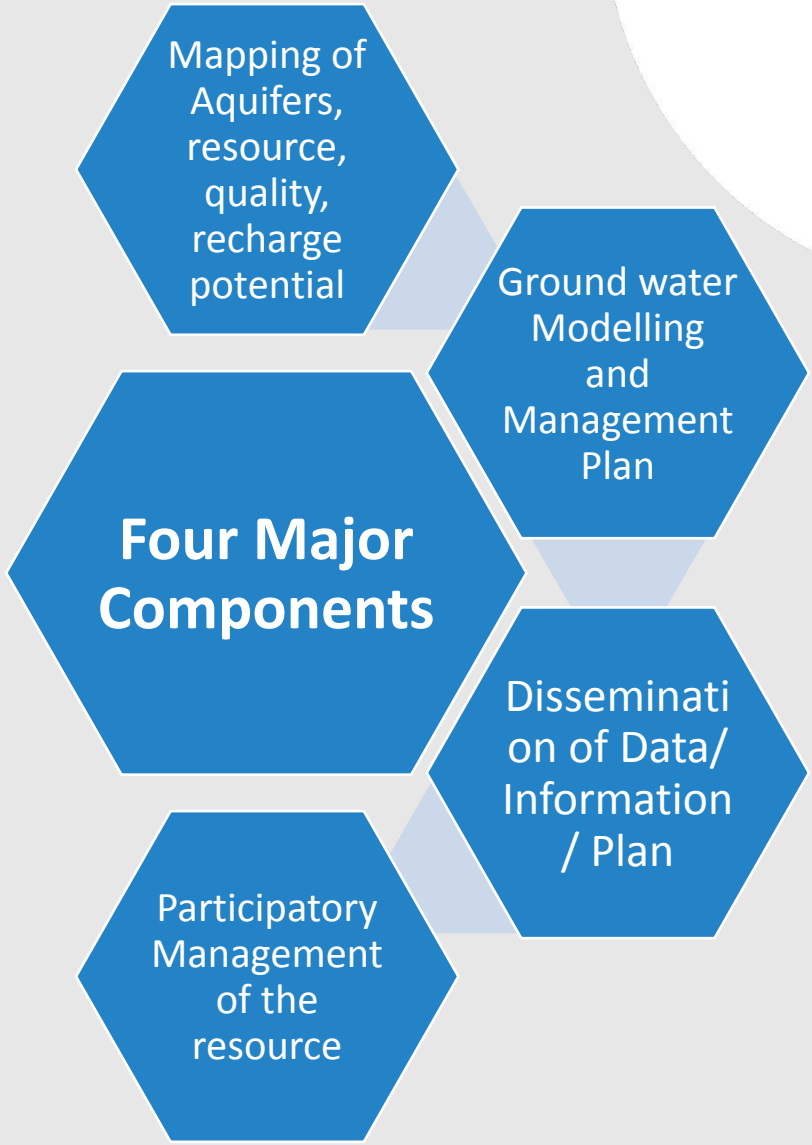
- Aquifers are the repositories for ground water storage – their dimensions, characteristics, quality, storage etc. need to be ascertained to manage them
- Ground water has a complex nature of occurrence, recharge, discharge etc.
- Shift from “ground water development” to ground water management” .
- What is needed is a standard methodology for aquifer mapping and management which ingrains the principles and practices of participatory management



Source:-https://gwptoolbox.org/learn/iwrm-tools/groundwater-management-plans
https://geospatialworldforum.org/speaker/SpeakersImages/aquifer-mapping-and-management-an-approach-in-indian-perspective.pdf

Aquifer Mapping & Management for Sustainable Groundwater Management

- National Aquifer Mapping and Management Programme (NAQUIM) commenced from year 2012.
- Out of 23 lakh sq.km mappable area, around 8.89 lakh sq.km area is envisaged to be covered in first phase (2012-17- XII FYP) and remaining during second phase .
- Identification and study of aquifers to guide future groundwater development
- Identification of areas for artificial recharge
- Input for the Development of Aquifer Information and Management System
- Placing of aquifer information on public domain for the use of all Stakeholders.
- Preparation of thematic layers (GIS Data Creation)



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Video on National Aquifer Mapping and Management Programme

Video Source:-https://www.youtube.com/watch?v=_FnW24U_WI4

Aquifer Mapping & Management for Sustainable Groundwater Management

Approach for Aquifer Mapping

Identification of areas and their prioritization in consultation with State governments.

Status of data availability and compilation.

Identification of data gaps.

Generation of data for filling up the gaps.
- Geology & Geophysics
- Hydrogeology & Exploration
- Remote Sensing & Water Quality

Processing and compilation of thematic maps on GIS Platform.

Assessment of Potentiality of Aquifer

Assessment of ground water resources

Identification of aquifer issues such as
- Ground water stressed areas
- Water quality vulnerable areas
- Water logging areas , etc.

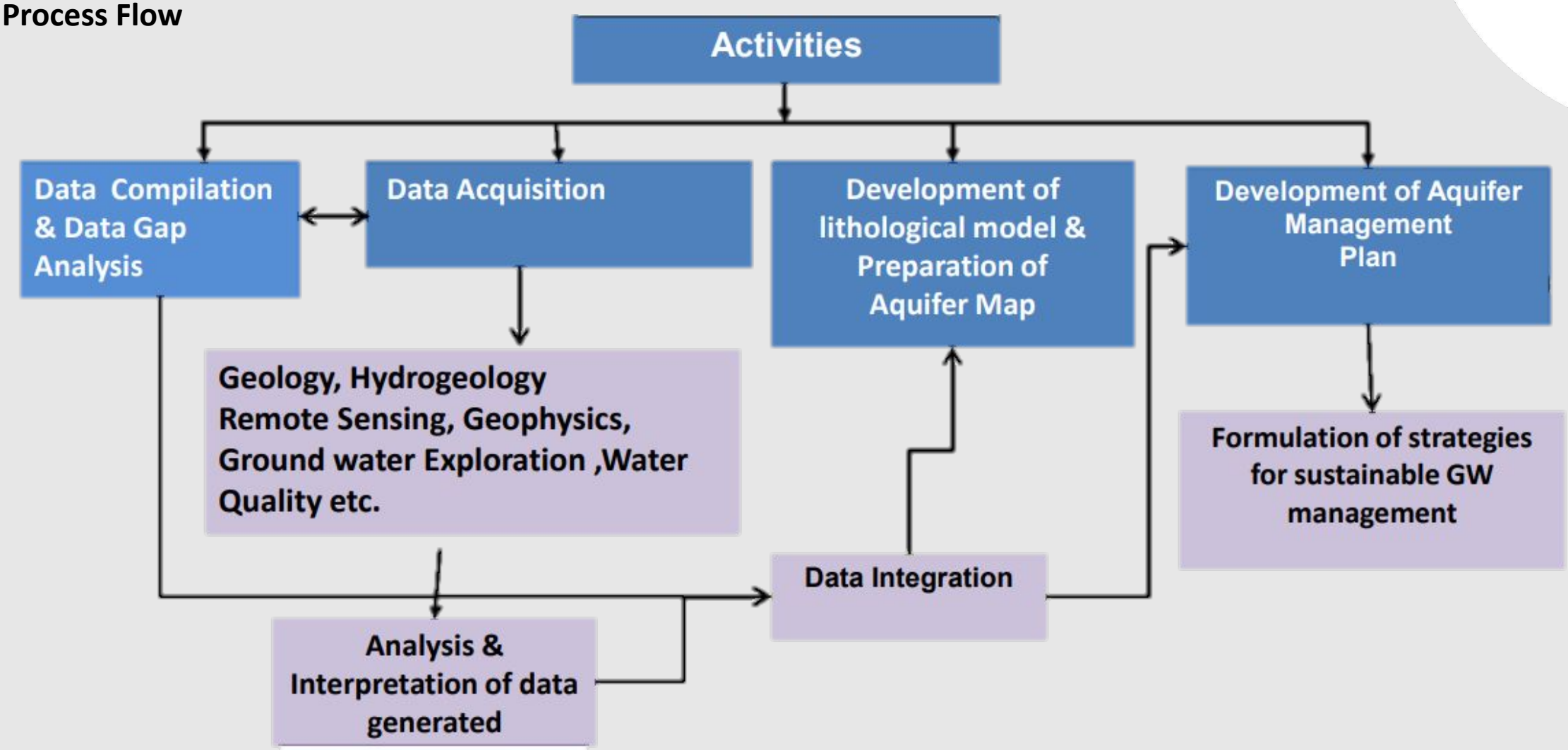
Development of ground water management plans for supply and demand side management through aquifer response modelling .

Development of Aquifer Information and Management System(AIMS)

Source:-https://geospatialworldforum.org/speaker/SpeakersImages/aquifer-mapping-and-management-an-approach-in-indian-perspective.pdf

Aquifer Mapping & Management for Sustainable Groundwater Management

Process Flow



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Aquifer Mapping & Management for Sustainable Groundwater Management

Advance Technologies

Heliborne Geophysical Surveys

High accuracy survey equipment -DGPS

Description	• A native description of maps
Sustainable yield management goal	• For the aquifers, stating that the average withdrawals should not exceed long-term recharge, at least as a guiding principal
Artificial recharge programs	• Inputs for implementing artificial recharge programmes effectively, indicating plans for implementing artificial recharge for the aquifers concerned.
Groundwater Management strategies	• aquifer mapping will lead to a groundwater management strategy, which includes appropriate demand-management strategies in addition to water use and recharge.
Location specific protocols and agreements	• Aquifer mapping will lead to location-specific protocols and agreements within the user community as well help arrive at a robust regulatory framework through legislation

Source:-https://geospatialworldforum.org/speaker/SpeakersImages/aquifer-mapping-and-management-an-approach-in-indian-perspective.pdf

Aquifer Mapping & Management in Haryana

Video Source:-https://www.youtube.com/watch?v=x_-mdwEkYAQ

Capacity Building at different levels including DIP team

1. NATIONAL LEVEL CAPACITY BUILDING:

This includes providing training, technical assistance, and workshops to enhance their understanding of the groundwater system and management.

2. STATE LEVEL CAPACITY BUILDING:

ABHY also focuses on capacity building at the state level. It provides technical assistance, training, and support to state governments to strengthen their capacity to plan, design, and implement groundwater management strategies.

3. DISTRICT LEVEL CAPACITY BUILDING:

It provides training and support to communities to develop their own groundwater management plans and implement sustainable groundwater use practices.

4. PANCHAYAT LEVEL CAPACITY BUILDING:

This includes providing training and support to panchayats to develop groundwater management plans, establish monitoring systems, and enforce regulations.

5. CAPACITY BUILDING FOR FARMERS:

This includes promoting the use of water-efficient technologies, crop diversification, and better farming practices that can reduce groundwater demand and improve water use efficiency.

Source:-Atal Bhujal Guidelines

Current Practices adopted and recommended in Faridabad District

Best Practices adopted in Faridabad

1. Use of MI (Drip Irrigation and Sprinkler system)
2. Crop Diversification - shifting from water intensive crops to less water intensive crops
3. Rejuvenation of ponds and other water recharging structures


Micro Irrigation


Crop Diversification


Rejuvenation of Ponds

Best Practices Recommended in Faridabad

1. Feeder Separation for Irrigation power supply.
2. Construction of Percolation ponds
3. Drainage line treatment
4. Recharge Trenches
5. Gully plugs / gabions


Feeder Separation for Irrigation power supply.


Gully plugs


Percolation Ponds


Recharge Trenches


Drainage Line Treatment

Current Practices adopted and recommended in Faridabad District

Key challenges on implementation of Atal Bhujal Yojana

1. Limited knowledge of line departments on the project.
2. The roles have not been clear to the line departments in the implementation of Atal Bhujal Yojana in the district.
3. The less involvement of women participation in the awareness meetings and decision making in the project.

Strategies on implementation of Atal Bhujal Yojana

1. Capacity Building of all the Line departments to improve the knowledge
2. Institutional strengthening and providing clear roles and responsibilities related to the scheme.
3. Involving 40% leaders as women in the institutional structure of the scheme which can help in gathering women for awareness meetings.

Source:-Faridabad District, Haryana

Current Practices adopted and recommended in Faridabad District

Group Specific Activities conducted

1. **Women:** Separate meetings with the women are conducted so that proper information and knowledge can be shared.
2. **School Children:** Drawings, paintings and speech competition are being organised in the schools and students are encouraged to plant more and more trees and conserve water
3. **Youth:** Awareness meetings are held with the youths. They are encouraged to initiate activities like, eco club, planting of trees, checking Sanitation of the village, etc.
4. **General Community:** organised Jal Panchayat, PRA, Awareness meetings, WSP report.

Group Specific Activities Recommended

1. **Women:** Focused Group Discussions can be done at community and dore to door level.
2. **School Children:** Can distribute school kits related to groundwater conservation to reach every household.
3. **Youth:** Focused group discussions can be done at community and dore to door level. And can involve youth in IEC activities.

Source:-Faridabad District, Haryana

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/

Thank You

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

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ATAL BHUJAL YOJANA

Sustainable Ground Water Resource Management

Learning Duration- 4 Hours

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02 Assessment of the impact of Climate Change on water resources

03 Strengthening Institutional Framework for Participatory Groundwater Management

04 Leadership Development in sustainable groundwater management

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

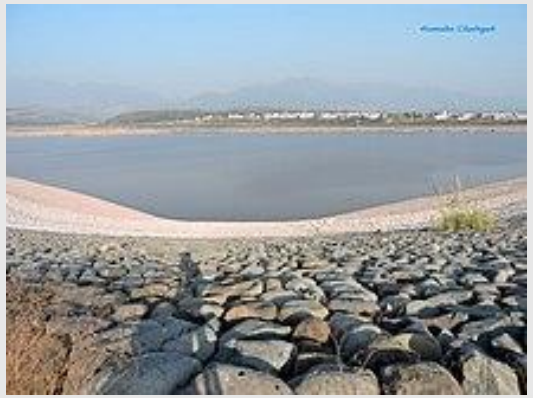
Strengthening Institutional Framework for Participatory Groundwater Management

Session - 2

Supply Side Engineering Adopted in Haryana for Groundwater Management

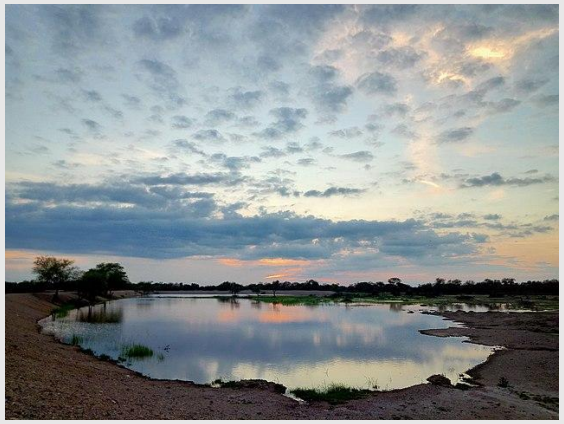
CONSTRUCTION OF CHECK DAMS AND SMALL RESERVOIRS:

Check dams and small reservoirs are constructed on streams and rivers to store rainwater and increase the groundwater recharge.



Source: https://india.mongabay.com/2021/07/groundwater-depletion-in-haryana-a-cause-of-serious-concern/

Supply Side Engineering Adopted in Haryana for Groundwater Management



REJUVENATION OF TRADITIONAL WATER BODIES:

The state government is also taking steps to revive the traditional water bodies like ponds and tanks, which were used for storing rainwater and recharging groundwater in the past.

Source: https://india.mongabay.com/2021/07/groundwater-depletion-in-haryana-a-cause-of-serious-concern/

Supply Side Engineering Adopted in Haryana for Groundwater Management

PROMOTION OF RAINWATER HARVESTING:

The state government is promoting rainwater harvesting techniques in both rural and urban areas. Rooftop rainwater harvesting and construction of recharge wells are some of the methods being used.





Source: https://india.mongabay.com/2021/07/groundwater-depletion-in-haryana-a-cause-of-serious-concern/

Supply Side Engineering Adopted in Haryana for Groundwater Management

USE OF TREATED WASTEWATER FOR IRRIGATION:

The state government has set up wastewater treatment plants to treat municipal and industrial wastewater. This treated wastewater is being used for irrigation purposes, thus reducing the pressure on groundwater resources.

Source: https://india.mongabay.com/2021/07/groundwater-depletion-in-haryana-a-cause-of-serious-concern/

Supply Side Engineering Adopted in Haryana for Groundwater Management

REGULATION OF GROUNDWATER USE:

The state government has also introduced regulations to control groundwater use. The use of groundwater for certain purposes, such as swimming pools and car washing, has been prohibited, and the extraction of groundwater for irrigation and domestic use is being monitored.

Source: https://india.mongabay.com/2021/07/groundwater-depletion-in-haryana-a-cause-of-serious-concern/

Supply Side Engineering Adopted in Haryana for Groundwater Management

- Crop diversification-rice-wheat cropping system (RWCS)
- Varietal interventions
- Direct Seeded Rice
- Conservation tillage
- Conjunctive use of brackish water/treated waste water- avoid pre-sowing irrigation, mixed use (two supply source merging at entry point in adjustable proportion), alternate irrigations
- Micro irrigation
- Sustainable farming system for waterlogged areas

Source: Agro-Technologies for water saving in Haryana by Prof. B.R. Kamboj

Varietal Interventions in Haryana

The strategy to save water through varietal interventions includes the squeezing of the rice crop period from 115-120 DAT (seed to seed-145-150 days) to 90-95 DAT (seed to seed-120-125 days).

The starting gap in yield of long duration varieties (LDV) and short duration varieties (SDV) was around 4 q/acre but it has narrowed down to minimum with improved genetic base and better crop husbandry.

In basmati the variety PB 1509, PB 1692 and PB 1847 are the leading SDV.-In non-basmati the leading variety is PR 126 and private sector popular hybrids.

The economics of SDV is good enough to be attractive and acceptable to the farmers. The cost of production is invariably less.

The scope of accelerating SDVs lies to the level of saturation in non-basmati and 50% in basmati

The reduction in average rice crop period by 20-25 days though SDVs would save 200 mm water.

Source: Agro-Technologies for water saving in Haryana by Prof. B.R. Kamboj

Direct Seeded Rice (DSR)

- The direct seeded rice (DSR) as an alternative to puddled transplanted rice (PTR) is the potential water saving technology in rice-wheat cropping system.
- The direct seeded rice is more successful in short duration varieties of rice and both interventions save water and are cross compatible.
- The estimate of water saving coming through reduced draft and accelerated recharge is 100 mm. The targeted area for DSR until 2025-26 may be 1.5 lacs ha.
- Even if there is yield penalty under odd circumstances, the same is compensated by the yield gain in succeeding crop. The yield gain in wheat crop is 4-5 % and it range from 10-15% in case of pulses and oilseeds.
- There is good scope of integrating micro irrigation in direct seeded rice







Source: Agro-Technologies for water saving in Haryana by Prof. B.R. Kamboj

Way forward for Direct Seeded Rice (DSR)

An area of 73000 acre was covered during kharif 2022 and 2 lakh acre has been targeted for kharif 2023 and 2.5 lakh acre for kharif 2024.

This can be achieved by enhancing the incentive from Rs. 4000 to Rs. 5000 per acre and further giving Rs. 1000 for cost of weedicide (weed is a menace in DSR). For both incentives, an additional load of Rs 40 crore is needed during kharif 2023 and Rs 50 crore in kharif 2024.

For DSR, the action window is available upto 15 May. Therefore, farmers are to be approached/ convinced from April end to 15 May.

50 % of the incentive should be given upto 15 June after first verification.

DSR seeding machines will be fixed with GPS facilities for optimum utilization and daily area covered.

Source: Agro-Technologies for water saving in Haryana by Prof. B.R. Kamboj

Direct Seeded Rice (DSR)

Source: Agro-Technologies for water saving in Haryana by Prof. B.R. Kamboj

Conservation Practices for Wheat

The conservation technologies includes **laser leveling, green manuring in summer fallows, Zero till wheat, happy seeder sown wheat, residue incorporation tillage practices and super seeder sown wheat** .

The cumulative potential of these technologies in an **annual crop calendar is to save one irrigation of 50-60 mm. The domain area to intervene is 2.3 million ha (wheat crop).**

Some of these technologies have already been adopted on substantial area but it would be possible to bring **additional 2.0 lacs ha by the year 2024-25 with cumulative water saving of 100 MCM.**

The necessary machinery support is available through CHCs. The need is to demonstrate the technologies to bring the mindset shift in the psyche of the farmers facilitating large scale adoption.

Source: Agro-Technologies for water saving in Haryana by Prof. B.R. Kamboj

Conservation techniques for wheat include

- Laser leveling,
- Green manuring in summer fallows,
- Zero till wheat,
- Happy seeder sown wheat,
- Residue incorporation tillage practices and
- Super seeder sown wheat .

Conservation techniques for wheat

2.0 lacs ha by the year 2024-25 with cumulative water saving of 100 MCM - The necessary machinery support is available through CHCs

For large scale adoption requires - demonstrate the technologies to bring the mindset shift in the psyche of the farmers

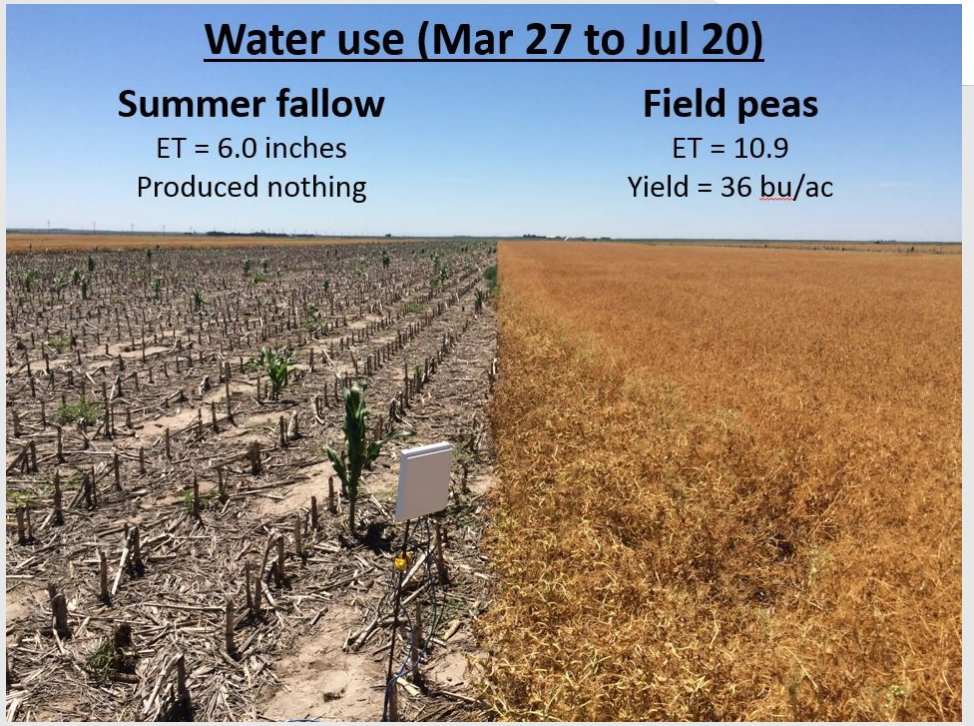
Laser levelled farming

- Laser land leveling is a water-saving technology as it uses scarce groundwater optimally by ensuring even coverage.
- A laser-leveled farm minimizes runoff and water-logging, ensuring that farmers use just as much water they need in the optimal way

Issues with Summer Fallows (Parti)

Summer fallows result in losses by evaporation and deep percolation (Berg et al., 1988, Dao, 1993, Farahani et al., 1998). These losses translate to

- Low storage efficiency of summer precipitation (WSE, the ratio of amount of water stored in soil profile to total rainfall received), and
- Low water use efficiency (WUE, the ratio of crop yield to evapotranspiration occurring during growing seasons).
- Water and wind erosion,
- Reductions in soil organic matter, and
- Increased weed infestations (Singh et al., 2019).



Source: https://doi.org/10.1016/j.eja.2023.126818

Zero till Wheat & Happy Seeder

Zero tillage is the best choice because crop residues retained in zero tillage

- decreases evaporation,
- controls soil temperature,
- reduces erosion (99 per cent),
- reduces total cultivation costs,
- increases soil organic carbon stock,
- enhances water use efficiency and
- increases crop yield on sustainable crops (16-64%).

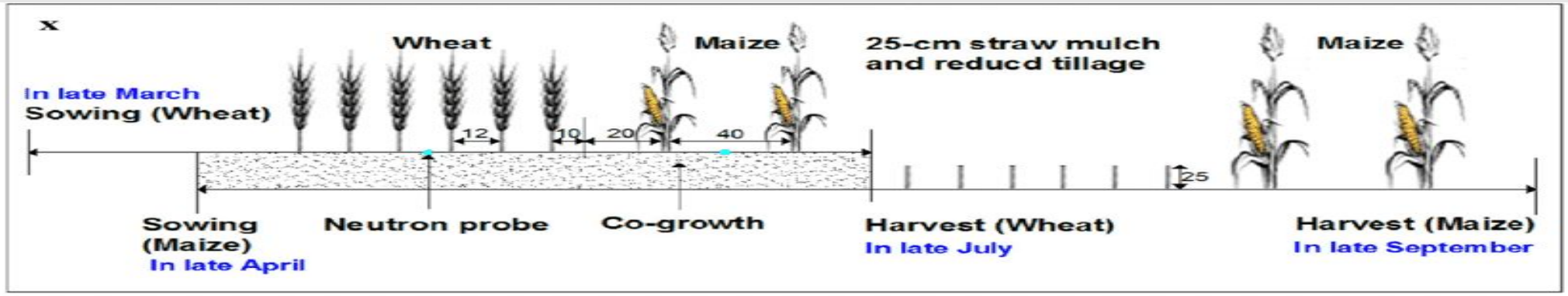
Conserved soil moisture

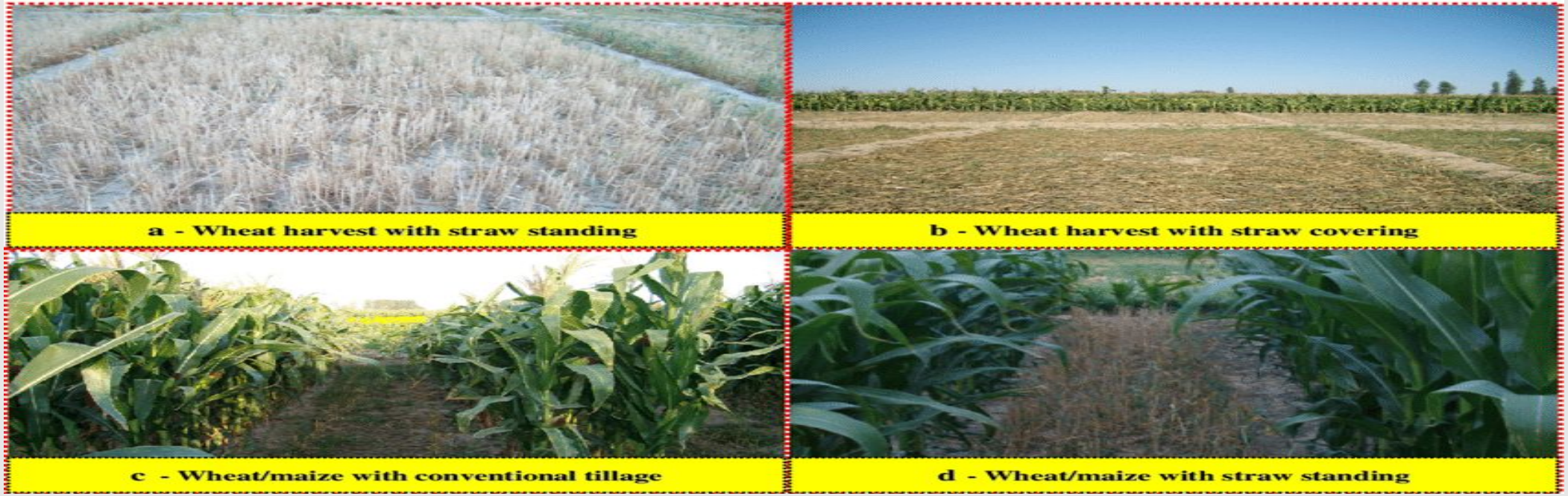
- helps minimise water inputs (20-30%) without impacting grain yields, which
- decreases diesel use @ 20 litres per acre

Benefit to cost reaction = 2-3.2

Source: DOI: https://doi.org/10.22271/chemi.2020.v8.i5ai.10698

Zero till Wheat





Source:
https://www.researchgate.net/publication/272396071_Wheat_and_maize_relay-planting_with_straw_covering_increases_water_use_efficiency_up_to_46

Zero Till Seed Sowing Technologies

Super Seeder is one of the unique technique which is used for sowing wheat without any burning of rice residue.

Happy Seeder is a no-till planter, towed behind a tractor, that sows (plants) seeds in rows directly without any prior seedbed preparation

Super Seeder vs Happy Seeder

With Happy Seeder, stubble of paddy remains in the field for a long time even after growing of the wheat crop <u>but with</u> Super Seeder stubble is buried under the earth and fields looks clean.

Water & soil wise strategies can be adopted

Sr. no.	Interventions	Strategic and basic research
1	Crop diversification	Productivity gain and stability in alternate crops through development of new variety/hybrids and refinement of other component technologies, Salt tolerant crops and varieties, integrating the use of TWW in different crops and cropping systems
2	Direct seeding of rice	New varieties/hybrids with specific suitability to DSR in basmati and non-basmati rice, sowing techniques and sowing machines, weed management, water management and nutrient management
3	Varietal interventions	New varieties/hybrids of short duration with resistance to insect pests/diseases/abiotic stresses and acceptable quality, productivity gain with improved agro-technologies, location specific variety centric cropping system
4	Conservation tillage	Long term experimentations for validation of technologies, new and efficient machineries, improvement in sowing and crop establishment techniques and concurrently addressing all the field problems
5	Anti-water-logging measures	Location specific agroforestry systems (bio-drainage), aquaculture options and integrated farming system (IFS)
6	Natural farming	Validation of natural farming technologies and evolving package of practices for different crops/cropping systems
7	Micro irrigation	Development of package of practices for different crops/cropping systems integrating suitable micro irrigation options

Source: Agro-Technologies for water saving in Haryana by Prof. B.R. Kamboj

Horticulture & Vegetable Crop – Way Forward

- Shadow value of water for horticulture crops is 0.80 paisa per ltr. in Kharif season and 0.25 paisa per ltr. in Rabi and Zaid season.
  - **At present, horticulture crops are grown on 10.37 lac acre which saves 2900 MCM of water having shadow value of Rs. 740 crore annum.**
  - **With additional area of 30000 acres, total water saving would be 80 MCM having shadow value of Rs. 60 crore per annum.**
- The **incentive for growing fruit and vegetable crop has been revised in 2022-23 ranging from 15000 to 20000 rupees per acre** and state has been able to increase this area by 22000 acres last year.
- Fruit crops are required to be promoted in integrated model of orchard, water farm pond, micro-irrigation ,etc.
- Vegetable crops are being promoted with new varieties, precision farming, low cost bamboo stacking, mulching and low tunnel.

Source: Agro-Technologies for water saving in Haryana by **Prof. B.R. Kamboj**

Existing schemes : Features

Green Manuring (Dhaincha)	• The physical properties of soil are improved; resultantly water retention capacity is enhanced and 20% water is saved in the crops of following season. • This also increases the mineral availability of essential elements, mainly N, K, S, Ca, etc. • The seed is provided to the farmer at 80% subsidy (about Rs. 580 per acre). • An area of 2,36,000 acre was covered during Kharif 2022 and 6 lakh acre has been targeted in kharif 2023 and 6.5 lakh acre in Kharif 2024.
Natural Farming	• Promotion of climate resilient farming in harmony with nature. Reduction in cost of cultivation and to make farming a sustainable livelihood option • Rs 3000 is given for purchase of drums and Rs 25,000 for desi cow as incentive. • An area of 6,000 acre was covered during Rabi 2022-23, and 20,000 acres has been targeted for 2023 -24 and 30,000 acre for 2024-25
Conservation Tillage	• Minimum soil disturbance and mulching is done with crop residue, which save water upto 20%. • An area of 8,43,000 acre was covered during 2022-23 and 9 lakh acre has been targeted for 2023-24 and 12 lakh acre for2024-25.

Source: Agro-Technologies for water saving in Haryana by **Prof. B.R. Kamboj**

Crop Diversification-Focus Area for Water Saving

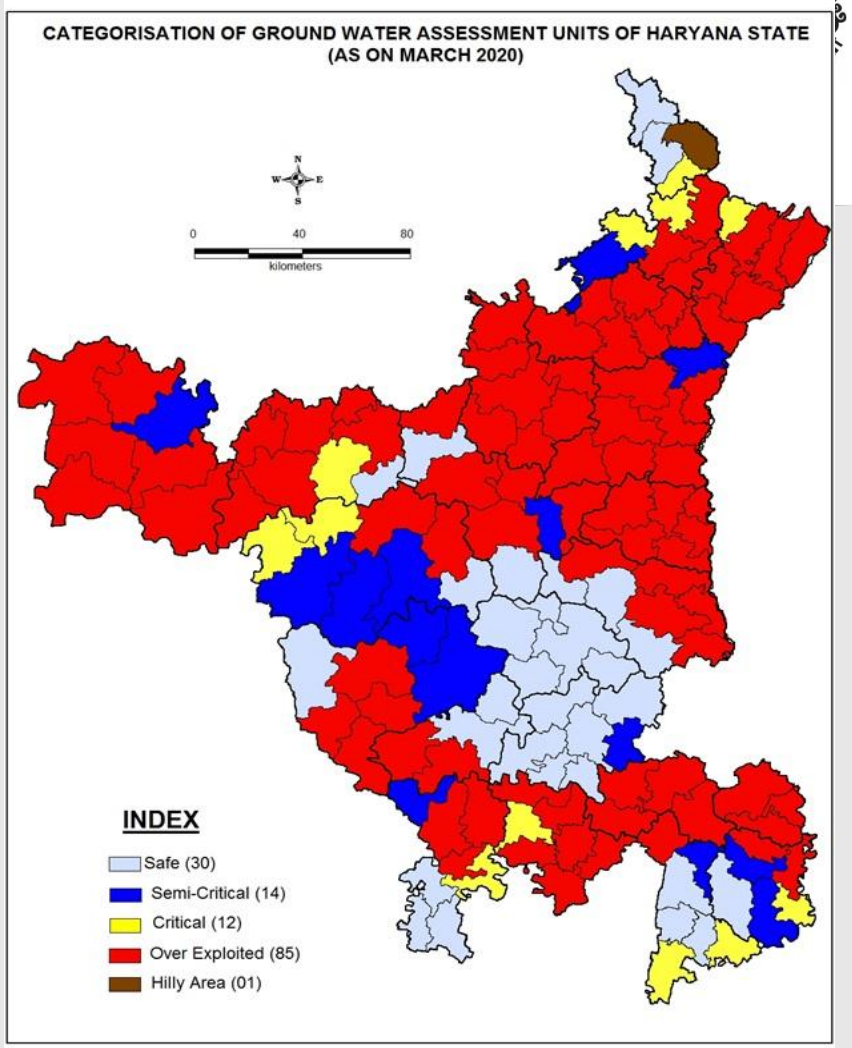
- The annual groundwater withdrawal in Haryana is 137% of its extractable ground water resources.
- The main reason is 6 to 7 times increase in paddy cultivation in Haryana in last 5 decades.
- Paddy was cultivated over 4.8 Lakh acre in 1966-67 whereas it went up to 34.1 Lakh acre in 2021-22.

Categorized on basis of ratio of total Annually Groundwater Extractable to the total Extraction (Comparison since 2004 to 2020)

Category of Blocks	2004	2009	2011	2013	2017	**2020**
Over-Exploited	55 (48%)	69 (59%)	71 (61%)	64 (54%)	78 (61%)	85 (60%)
Critical	11 (10%)	21 (18%)	15 (13%)	14 (12%)	03 (2%)	12 (09%)
Semi-Critical	5 (4%)	9 (8%)	7 (6%)	11 (9%)	21 (16%)	14 (10%)
Safe	43 (38%)	18 (15%)	23 (20%)	30 (25%)	26 (21%)	30 (21%)
TOTAL	**114**	**117**	**116**	**119**	**128**	**141**

Over Exploited: >100%:Critical, Between 90 to 100%, Semi-Critical: Between 70 to 90%, Safe: <70%

Categorization of Ground Water Assessment Units of Haryana State as on March, 2020



source: department of agriculture & farmers welfare, Haryana

A video on Natural Farming

Video Source: https://www.youtube.com/watch?v=AzmXb9Kwr04

A video on Empowering women in Agriculture

Women Led - Vegetable Farming

Video Source: https://www.youtube.com/watch?v=D_z5RUsIj3c

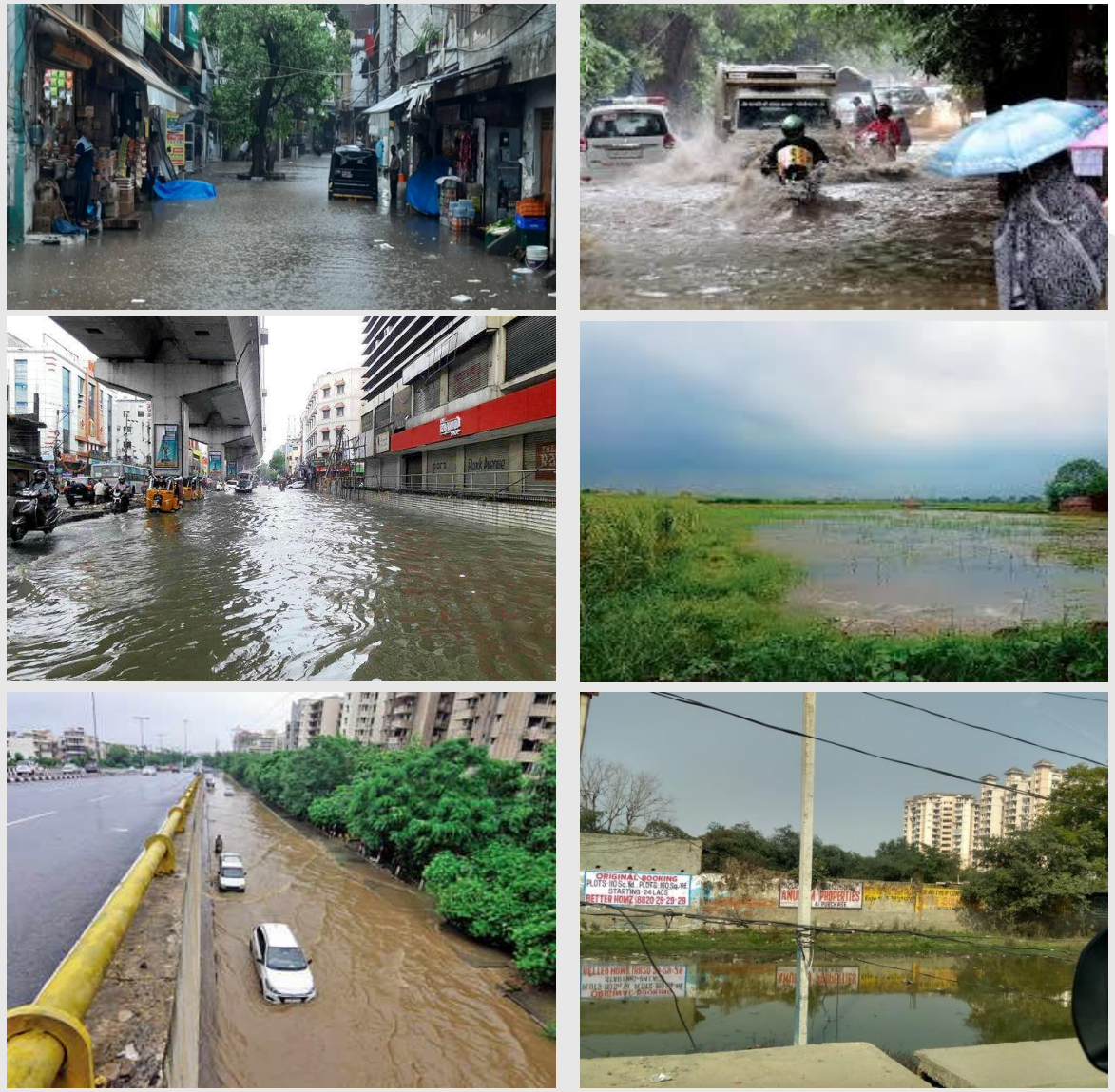
Progression of Soil Salinization in Haryana

- **~9% area of Haryana state is affected with waterlogging and soil salinization**
- **Soil salinity is increasing at 7-8% per annum whereas soil sodicity is decreasing@1-2%.**

source: department of agriculture & farmers welfare, Haryana

Major Causes of Waterlogging & Soil Salinization

- Major Shift in Water and Salt balance in agriculture after introduction of canal and tubewell irrigation
- Average quantum of Salts applied to Irrigated Farms varies from 1.0 to 25.2 tonnes/ha based on canal water, groundwater and its conjunctive use studies
- Rise of water table is compounded by inadequate drainage provision and increased congestion/blockage in cross drainage due to rapid growth of infrastructural projects
- Further, neglect of Drainage is a serious issue to be addressed once a while in 9% area of Haryana state to achieve Land Degradation Neutrality status of the State



source: department of agriculture & farmers welfare, Haryana

Integrated Strategies for Management of Waterlogging and soil salinity in Haryana

1. Preventive Measures by **decreasing irrigation water allowance and salt inflow**, and improving irrigation efficiency
(Efficient Water and Salt Management)

2. Reclamative/Curative measures by **increasing water and salt outflow**
(Adequate integrated drainage, salt leaching & disposal, drainage water reuse)

Poor water management (Rise in water table)

Waterlogging & Soil salinity

Drainage and leaching

Sustainable productivity

For Achieving Annual Installation Targets In 25,000-30,000 Acres.

source: department of agriculture & farmers welfare, Haryana

Recommendations for improving water logging

Integrated drainage is necessity for reclamation of waterlogged and **saline lands, doubling farmers' income and achieving sustainable irrigated agriculture in the state.**

Functional Surface drainage is a pre-requisite for success of all drainage and reclamation projects in the state.

Pace of reclamation of waterlogged and saline areas using SSD technology is quite low and needs to be expanded through both in-house capacity strengthening & project outsourcing with handholding.

Vertical drainage is successful where drainage water is used directly or conjunctively for irrigation or disposed off safely through large drains/canals without causing downstream water pollution.

Saline aquaculture, bio drainage, salt tolerant varieties, saline agro-horticulture, agroforestry, etc. needs to be integrated with drainage projects for major complementary benefits.

Sub-surface drip/micro irrigation needs to be promoted for water savings as well as for enhancing yield from potentially waterlogged and saline areas

source: department of agriculture & farmers welfare, Haryana

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/

Thank You

on behalf of

All India Institute of Local Self Government

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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

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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

Sustainable Ground Water Resource Management

Learning Duration- 4 Hours

Training Programme

Introductory

Module Overview

The following will be covered

01 Institutional Strengthening under Atal Bhujal

02 Assessment of the impact of Climate Change on water resources

03 Strengthening Institutional Framework for Participatory Groundwater Management

04 Leadership Development in sustainable groundwater management

05 Good Governance and Skilling & Employment Generation for implementing ABhY

Session Overview

SL. No.	Session no	Topic	Sub Topic	Time (in Min)
1	Session 1	Institutional Strengthening under Atal Bhujal	How to strengthen the groundwater governance mechanism in the states	10 mins
			Incentive component rewarding/the states for various measures aimed at ensuring the long-term sustainability of groundwater resources.	20 mins
			Sustainable management of Groundwater	20 mins
			District wise adopted & recommended strategies for Implementation	10 mins
2	Session 2	Strengthening Institutional Framework for Participatory Groundwater Management	Supply Side Engineering in Haryana	25 mins
			Demand Side Interventions in Haryana	25 mins
BREAK				15 mins
3	Session 3	Leadership Development in sustainable groundwater management	Assessment of Resources, Macro policy adjustments and Policy/political dialogue on land-use	15 mins
			Reducing pumping energy subsidies, tuning crop guarantee prices & Use measurement and reduction	15 mins
			Regulatory Provisions and Community Participation	15 mins
LUNCH BREAK				45 mins

Session Overview

SL. No.	Session no	Topic	Sub Topic	Time (in Min)
4	Session 4	Good Governance and Skilling & Employment Generation for implementing ABhY	Principles of Good Governance & allocation of responsibilities with a Governance model	15 mins
			Existing situation , Groundwater Governance Mechanisms	20 mins
			Gender Inclusion in Good Governance mechanism	10 min
Tea Break				10mins
5	Session 5	Convergence of Institutions and Missions	Process and Benefits of Convergence	15 min
			Convergence with various schemes	15 min
			Convergence between different Institutions in Haryana	15 min
6	Session 6	Group Work	Identify and suggest ways/ methods to engage with the stakeholders for Sustainable Groundwater Management	45 mins
			Presentation of the Work by team	20 mins
			Open Discussion and Final Remarks on Group Work	15 mins
7	Session 7	Feedback and Closing	Summarization of the sessions and Feedbacks	15 mins
			End note	10 mins

Learning Objectives

- Institutional Strengthening and Sustainable management of Groundwater
- Demand and Supply side interventions adopted in Haryana
- Leadership Development for participatory groundwater management
- Good Governance mechanism and Gender Inclusion for implementation of Atal Bhujal Yojana
- Convergence between different institutions and other schemes

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

Leadership Development in sustainable groundwater management

Session - 3

Leadership Development

- Sustainable groundwater management **requires effective leadership at various levels,** including government agencies, non-governmental organizations, and communities.

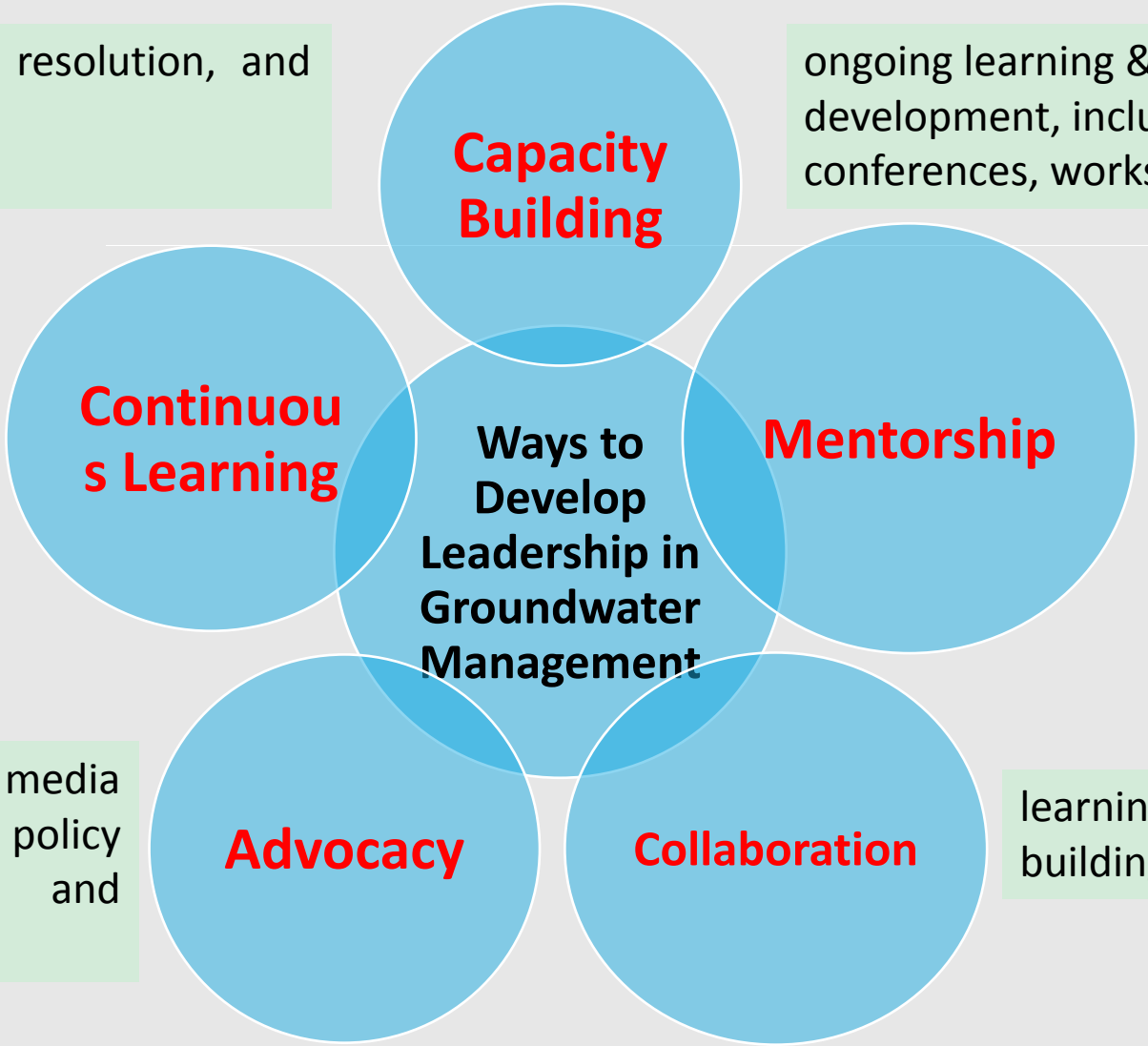
- Leadership development in sustainable groundwater management **involves the acquisition of skills and knowledge necessary for decision-making, stakeholder engagement, and policy formulation that promotes sustainable groundwater use**.

Source:- https://unesdoc.unesco.org/ark:/48223/pf0000381318

Leadership Development

communication, conflict resolution, and strategic planning

ongoing learning & professional development, including attending conferences, workshops, & training programs



ongoing learning and professional development, including attending conferences, workshops, and training programs

provide guidance and support to mentees, help them develop critical thinking skills, and provide opportunities for professional growth and development

community engagement, media outreach, and policy development and implementation

learning, networking, and building leadership skills

Source:- https://unesdoc.unesco.org/ark:/48223/pf0000381318

Assessment of Groundwater Resources in Haryana

According to the Central Ground Water Board (CGWB)

14.77 billion cubic meters (BCM) — Annual Rechargeable Groundwater Resource Availability

20.95 billion cubic meters (BCM) — Annual Groundwater Draft for various uses

Groundwater Extraction Rate

1.4 times its Recharge Rate — the State is Over-Exploiting its Groundwater Resources

According to CGWB data, in 2019

75% wells — Showed a Decline of Groundwater more than ONE meter

According to the 2018 report by the National Institution for Transforming India (NITI) Aayog

80% groundwater extracted — NOT fit for drinking

The Haryana State Government has Implemented

1,585 Groundwater Monitoring Wells

1,069 Piezometers to monitor Groundwater levels & quality

The government has also established a system of groundwater regulation and control, including the formation of groundwater user associations, the establishment of groundwater monitoring committees, and the development of groundwater conservation and regulation policies.

Source:- http://cgwb.gov.in/gw_profiles/st_Haryana.htm

http://cgwb.gov.in/documents/papers/incidpapers/paper%201-b.m.jha.pdf

Macro-Policy Adjustments in Haryana

There have been several macro policy adjustments in groundwater management in Haryana over the years. Some of the significant policy changes include:

Implementation of the Haryana Groundwater (Control and Regulation) Act, 2011:

- It empowers the government to regulate the **drilling of borewells , control groundwater abstraction, and promote sustainable use of groundwater resources.**

Promotion of Micro-Irrigation:

- In 2019-20, the state government provided a **subsidy of up to 75% for the installation of micro-irrigation systems.**

Formation of Groundwater User Associations:

- GUAs are local-level institutions that **promote collective action among groundwater users, including farmers and industries.**

Source:-
https://hid.gov.in/Portals/0/THE%20HARYANA%20WATER%20RESOURCES%20%28CONSERVATION%2C%20REGULATION%20AND%20MANAGEMENT%29%20AUTHORITY%20ACT%2C%202020.pdf

Macro-Policy Adjustments in Haryana

There have been several macro policy adjustments in groundwater management in Haryana over the years. Some of the significant policy changes include:

Implementation of the National Rural Drinking Water Programme (NRDWP):

- The NRDWP is a centrally sponsored scheme that **aims to provide safe drinking water to rural areas**.

Setting up of the Haryana State Water Regulation and Development Authority (HSWRDA):

- The authority has been mandated **to formulate policies for water resource management, regulate groundwater abstraction, and resolve disputes related to water sharing**.

Source:-
https://hid.gov.in/Portals/0/THE%20HARYANA%20WATER%20RESOURCES%20%28CONSERVATION%2C%20REGULATION%20AND%20MANAGEMENT%29%20AUTHORITY%20ACT%2C%202020.pdf

Reducing pumping energy subsidies

Pumping energy subsidies are government subsidies provided to farmers for electricity used to pump groundwater. These subsidies can encourage farmers to over-extract groundwater and lead to the depletion of groundwater resources.

Gradual reduction in subsidies:

- This can be done by reducing the subsidy amount by a small percentage each year, giving farmers enough time to adjust to the new policy.

Implementing a targeted subsidy system:

- This can be done by setting up a system of water metering and providing subsidies only to farmers who use groundwater within certain limits.

Promoting the use of solar pumps:

- The Haryana government can promote the use of solar pumps, which are a more sustainable alternative to electric pumps.

Developing awareness campaigns:

- This can help farmers understand the need for reducing pumping energy subsidies and promote a more sustainable approach to groundwater management.

Source:- https://www.iisd.org/publications/report/targeting-agricultural-electricity-subsidies-haryana

Tuning crop guarantee prices

Tuning crop guarantee prices in Haryana can be a useful measure to promote sustainable groundwater management in the state. Crop guarantee prices are the minimum prices guaranteed by the government to farmers for their crops.

1. Promoting crops that require less water:

The government can provide higher guarantee prices for crops that require less water, such as pulses, oilseeds, and millets, and lower guarantee prices for water-intensive crops like paddy.

2. Linking guarantee prices to groundwater levels:

- The government can provide higher guarantee prices to farmers in regions where the groundwater levels are declining, encouraging them to adopt water-saving practices.

3. Providing incentives for sustainable farming practices:

- The Haryana government can provide incentives for farmers who adopt sustainable farming practices such as crop rotation, mulching, and intercropping.

4. Developing awareness campaigns:

- This can help farmers understand the need for tuning crop guarantee prices and promote a more sustainable approach to groundwater management.

Policy/political dialogue on Land-Use

Land-use policies can have a significant impact on groundwater resources, and it is important to ensure that land-use policies are aligned with sustainable groundwater management goals.

1. Bringing together stakeholders:

- This can help to develop a shared understanding of the issues and potential solutions

2. Developing a groundwater atlas:

- This can be used to inform land-use policies and help policymakers make informed decisions about land-use.

3. Integrating land-use planning and groundwater management:

- This can be done by conducting a comprehensive assessment of land-use patterns and developing land-use policies that promote sustainable use of groundwater resources.

4. Developing a communication strategy:

- This can include using various communication channels, such as social media, workshops, and public meetings, to engage with stakeholders and the public.

Source:- https://portals.iucn.org/library/sites/library/files/documents/2016-039.pdf

Regulatory Provisions

Groundwater is a common-pool resource that requires careful management to ensure its sustainability, and regulations can help to achieve this goal.

Licensing of groundwater extraction:	The licenses are issued to ensure that the extraction is done in a sustainable manner and to prevent over-extraction.
Restrictions on drilling of borewells:	The regulations specify the depth to which borewells can be drilled and the minimum distance between borewells.
Groundwater conservation zones:	These zones are designated based on the availability of groundwater and the rate of groundwater depletion.
Water pricing:	The pricing is based on the volume of groundwater extracted, and the rates are higher for excessive use of groundwater.
Monitoring and enforcement:	The groundwater levels are monitored regularly, and those who violate the regulations are penalized.

Source:- iwmi.cgiar.org/Publications/CABI_Publications/CA_CABI_Series/Ground_Water/protected/Giordano_1845931726-Chapter8.pdf

Groundwater Access and use codes

These codes are intended to ensure that groundwater resources are used in a sustainable and equitable manner.

1. Groundwater allocation:	2. Maximum permissible limits:	3. Time and duration of groundwater extraction:	4. Groundwater recharge:	5. Conservation and management practices:
• The codes specify the allocation of groundwater resources among different users. The allocation may be based on factors such as land area, crop type, and water requirements.	• This helps to prevent over-extraction of groundwater, which can lead to depletion of groundwater resources.	• The codes specify the time and duration during which groundwater can be extracted.	• The codes may require users to recharge the groundwater resources that they extract. This helps to maintain groundwater levels and prevent depletion of groundwater resources.	• This may include measures such as rainwater harvesting, use of drip irrigation, and adoption of water-efficient crops.

Source:- http://cgwb.gov.in/GW-Assessment/Review%20of%20Interantional%20Practices%20on%20Assessment%20of%20GW%20Resources.pdf

Groundwater use rights and charging

In Haryana, groundwater use rights and charging are regulated through the Haryana Groundwater (Development and Management) Act, 2009, and the Haryana Groundwater (Development and Management) Rules, 2012.

Groundwater use rights:	• Under the Haryana Groundwater Act, 2009, every person who extracts groundwater is required to obtain a No Objection Certificate (NOC) from the concerned authorities.
Groundwater charges:	• The Haryana government levies a charge for groundwater extraction. The charge is based on the volume of groundwater extracted and varies based on the category of the user.
Water pricing:	• The pricing is based on the volume of groundwater extracted, and the rates are higher for excessive use of groundwater.
Groundwater conservation fee:	• The fee is levied on users who extract groundwater above the permissible limit specified in the NOC.
Water metering:	• This helps in monitoring the volume of groundwater extracted and charging the appropriate fee.

Source:- https://www.researchgate.net/publication/355789526_Groundwater_Sustainability_and_Governability_in_Haryana

Groundwater use rights video

Video

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

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ATAL BHUJAL YOJANA

Sustainable Ground Water Resource Management

Learning Duration- 4 Hours

Training Programme

Introductory

Module Overview

The following will be covered

01 Institutional Strengthening under Atal Bhujal

02 Assessment of the impact of Climate Change on water resources

03 Strengthening Institutional Framework for Participatory Groundwater Management

04 Leadership Development in sustainable groundwater management

05 Good Governance and Skilling & Employment Generation for implementing ABhY

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			Reducing pumping energy subsidies, tuning crop guarantee prices & Use measurement and reduction	15 mins
			Regulatory Provisions and Community Participation	15 mins
LUNCH BREAK				45 mins

Session Overview

SL. No.	Session no	Topic	Sub Topic	Time (in Min)
4	Session 4	Good Governance and Skilling & Employment Generation for implementing ABhY	Principles of Good Governance & allocation of responsibilities with a Governance model	15 mins
			Existing situation , Groundwater Governance Mechanisms	20 mins
			Gender Inclusion in Good Governance mechanism	10 min
Tea Break				10mins
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			Convergence with various schemes	15 min
			Convergence between different Institutions in Haryana	15 min
6	Session 6	Group Work	Identify and suggest ways/ methods to engage with the stakeholders for Sustainable Groundwater Management	45 mins
			Presentation of the Work by team	20 mins
			Open Discussion and Final Remarks on Group Work	15 mins
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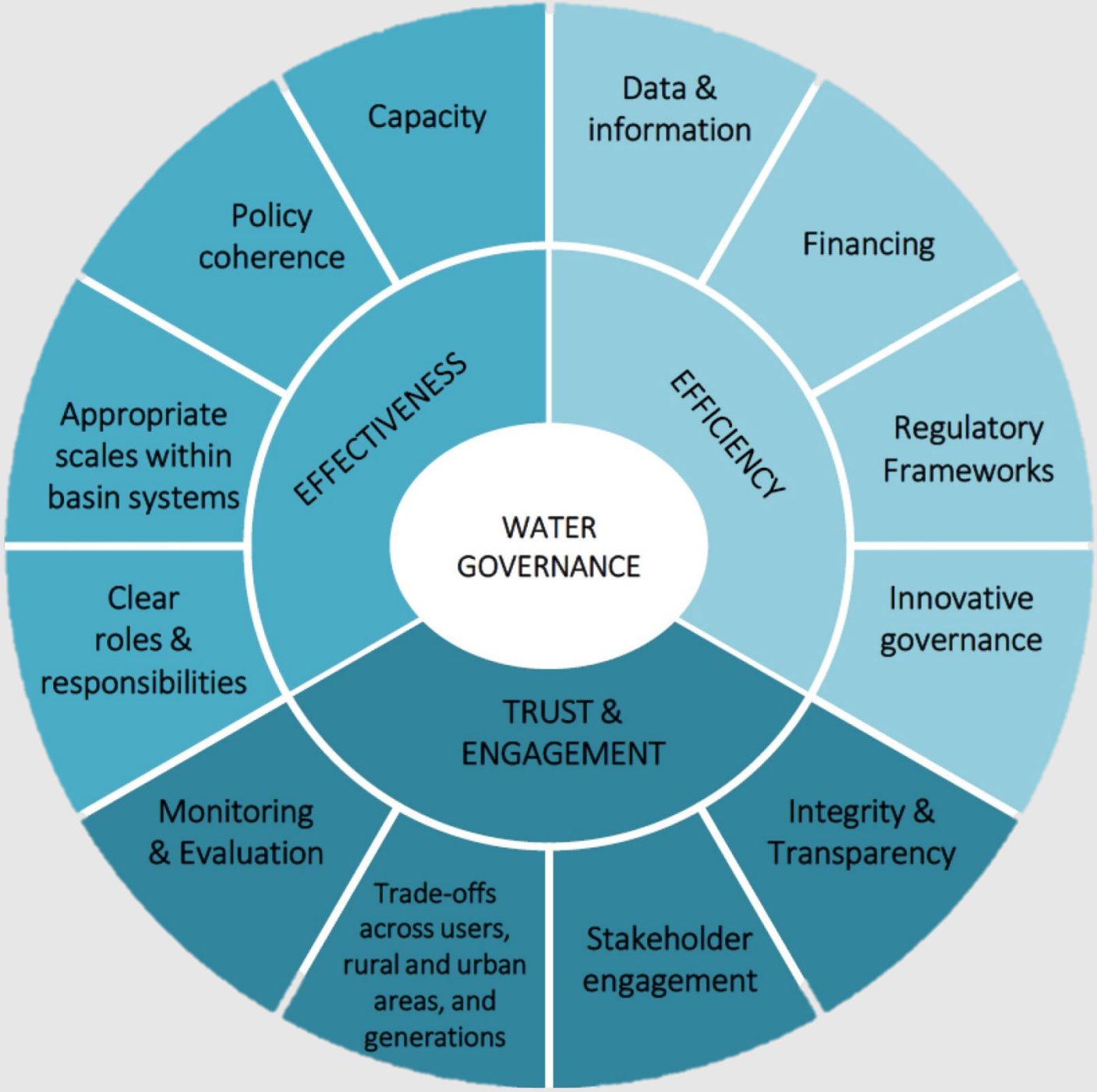
			End note	10 mins

Learning Objectives

- Institutional Strengthening and Sustainable management of Groundwater
- Demand and Supply side interventions adopted in Haryana
- Leadership Development for participatory groundwater management
- Good Governance mechanism and Gender Inclusion for implementation of Atal Bhujal Yojana
- Convergence between different institutions and other schemes



Good Governance

Session - 4

Good Governance

Good Governance

- Governance refers to all processes of governing, the institutions, processes and practices through which issues of common concern are decided upon and regulated. Good governance adds a normative or evaluative attribute to the process of governing.

Groundwater Governance

- The process by which groundwater is managed through the **application of responsibility, participation, information availability, transparency, custom, and rule of law.** It is the art of coordinating administrative actions and decision making between and among different jurisdictional levels one of which may be global.'

Source: https://www.un-igrac.org/areas-expertise/groundwater-governance

Principles of Good Governance and allocation of responsibilities

- Groundwater governance processes take place at multiple scales and **geographic levels, from the local, district/provincial and federal-level up to international levels** including regional and transboundary scales.
- **Stable legal frameworks** enable governments and groundwater users to plan for resources management over the long term.
- **Governments need to fully assume their role as resource custodians** in view of the common/public good aspects of groundwater.

Accountability

Stakeholder Participation

Equitable Access

Transparency

Inclusiveness

Source: https://www.unesco.org/reports/wwdr/2022/en/governance#:~:text=Principles%20for%20'good'%20water%20governance,transparency%2C%20stakeholder%20participation%2C%20inclusiveness./

Allocation of Responsibilities

Allocation of Responsibilities between the Centre and States

Union List (List-I)

Regulation and Development of Inner-State Rivers, Groundwater Resources, Natural Resources, Railways, Defence , Atomic Energy, etc.

State List (List-II)

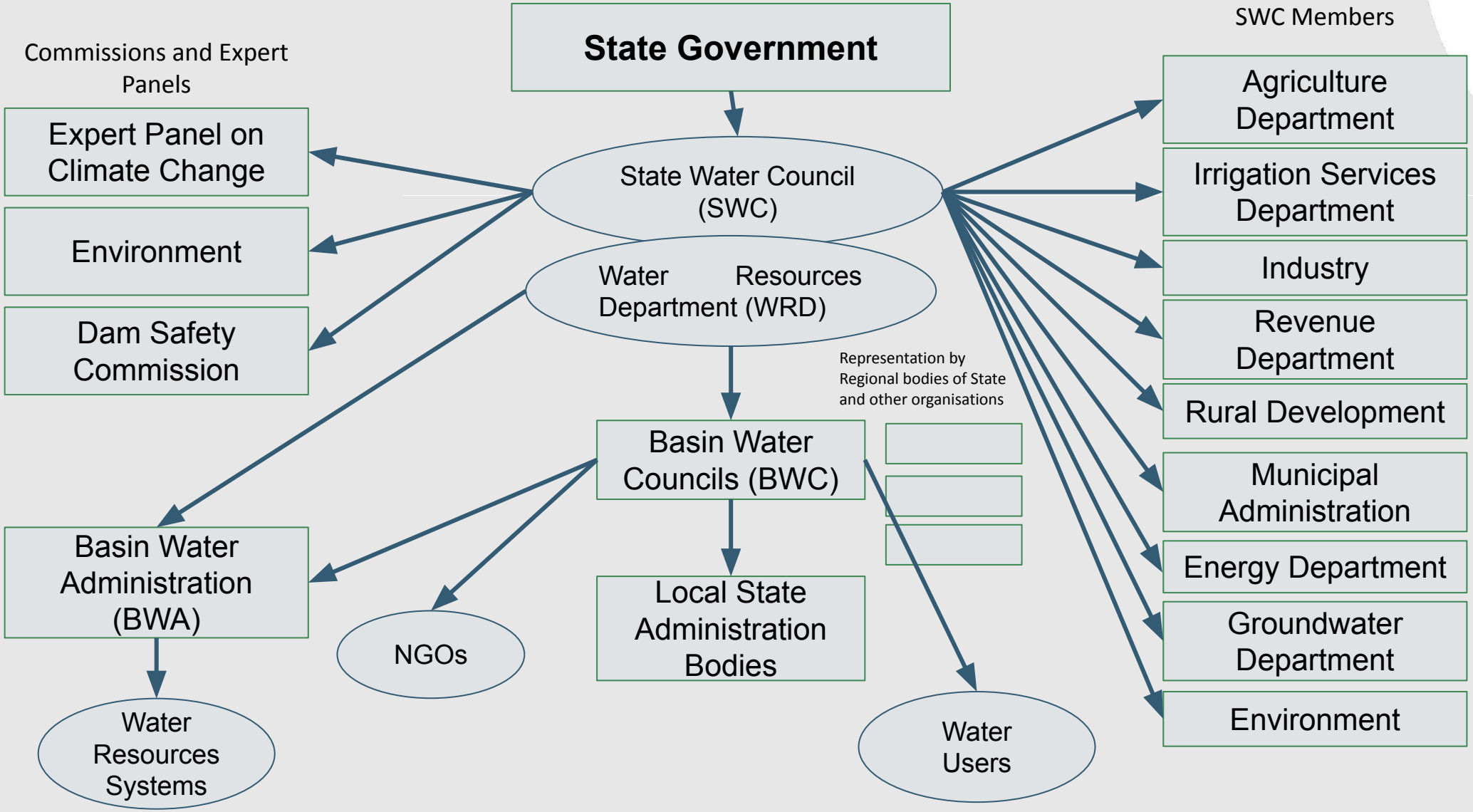
All matters related to Water subject to provisions of Union List, Agriculture, Land, Public Officer, Irrigation & Water Resources Department, etc.

Concurrent List (List-III)

Electricity, Forests, Economic & Social Planning etc.

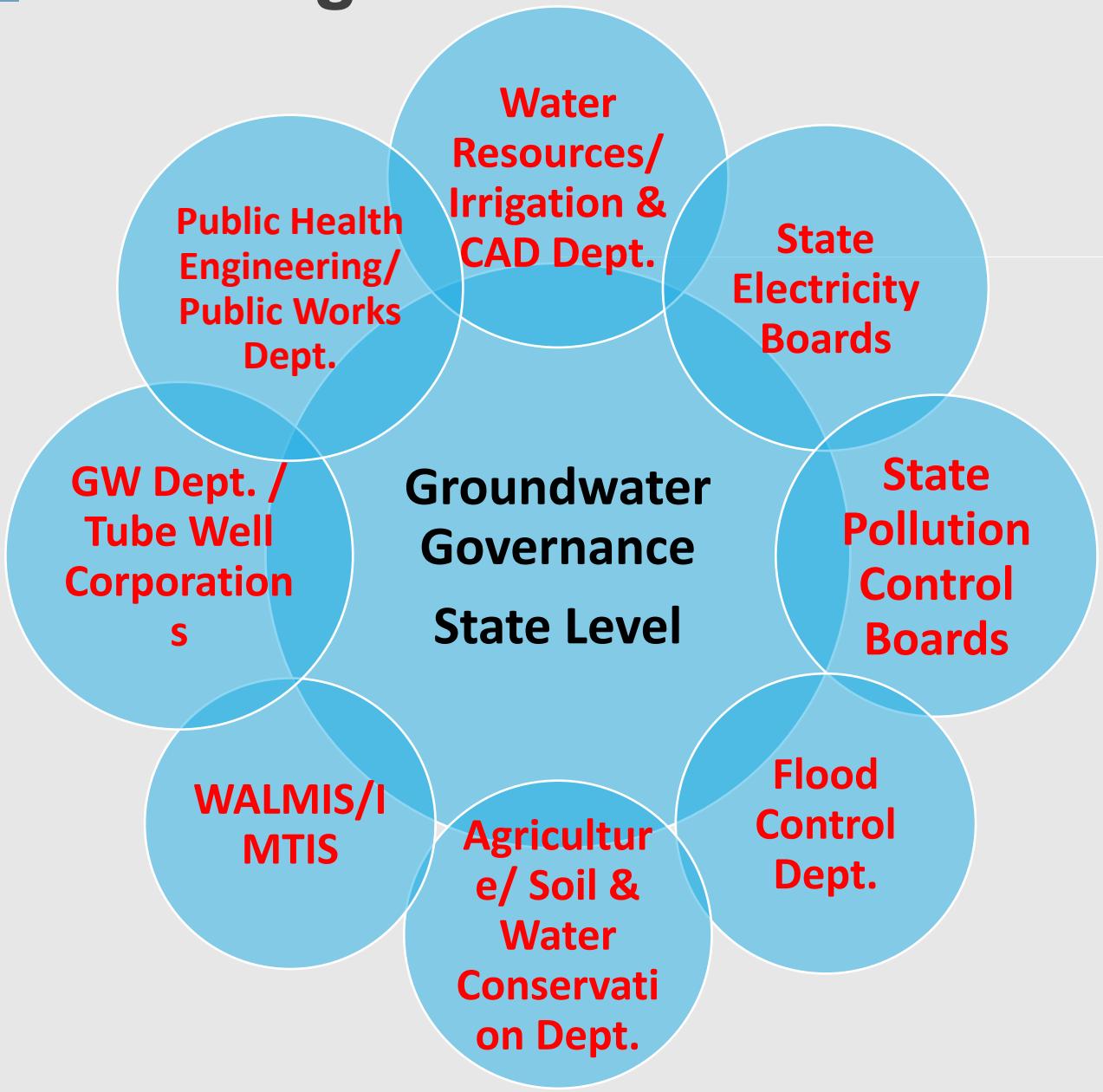
Source: https://nwa.mah.nic.in/sdmc/governance/01_goi.htm/

Building a Governance Model



Source:
https://www.google.com/imgres?imgurl=https%3A%2F%2Fwww.ceew.in%2Fsites%2Fall%2Fthemes%2Fceew%2Fimages%2Fwrm-resources.png&tbnid=WJPMh0N6qLd-2M&vet=12ahUKEwiunKOEp9j-AhUE2HMBHT7sAlEQMygAegUIARDBAQ..i&imgrefurl=https%3A%2F%2Fwww.ceew.in%2Fpublications%2Fnational-water-resources-framework-study&docid=dSCXk6_3r8njjM&w=1342&h=1060&q=governance%20model%20for%20water%20resources%20management%20in%20India&ved=2ahUKEwiunKOEp9j-AhUE2HMBHT7sAlEQMygAegUIARDBAQ

Building a Governance Model



Types of Institutional tools for Groundwater Governance

Information Based	Data (crop water requirements, weather, ET), crop water budgeting, extension/training, decision support system
Regulation	Well spacing/licensing, Irrigation schedules/quotas, metering, protected areas
Procedural (Social Learning)	Experimental games, multi-stakeholder dialogue, participatory hydrological modelling, crop water budgeting
Financial	Water Trariffs/ prices, fees, fines, energy pricing/ solar irrigarion or subsidies
Organizational	Forums, federations, WUAs, social networks, multi-stakeholder forums

Source: https://nwa.mah.nic.in/sdmc/governance/01_goi.htm/

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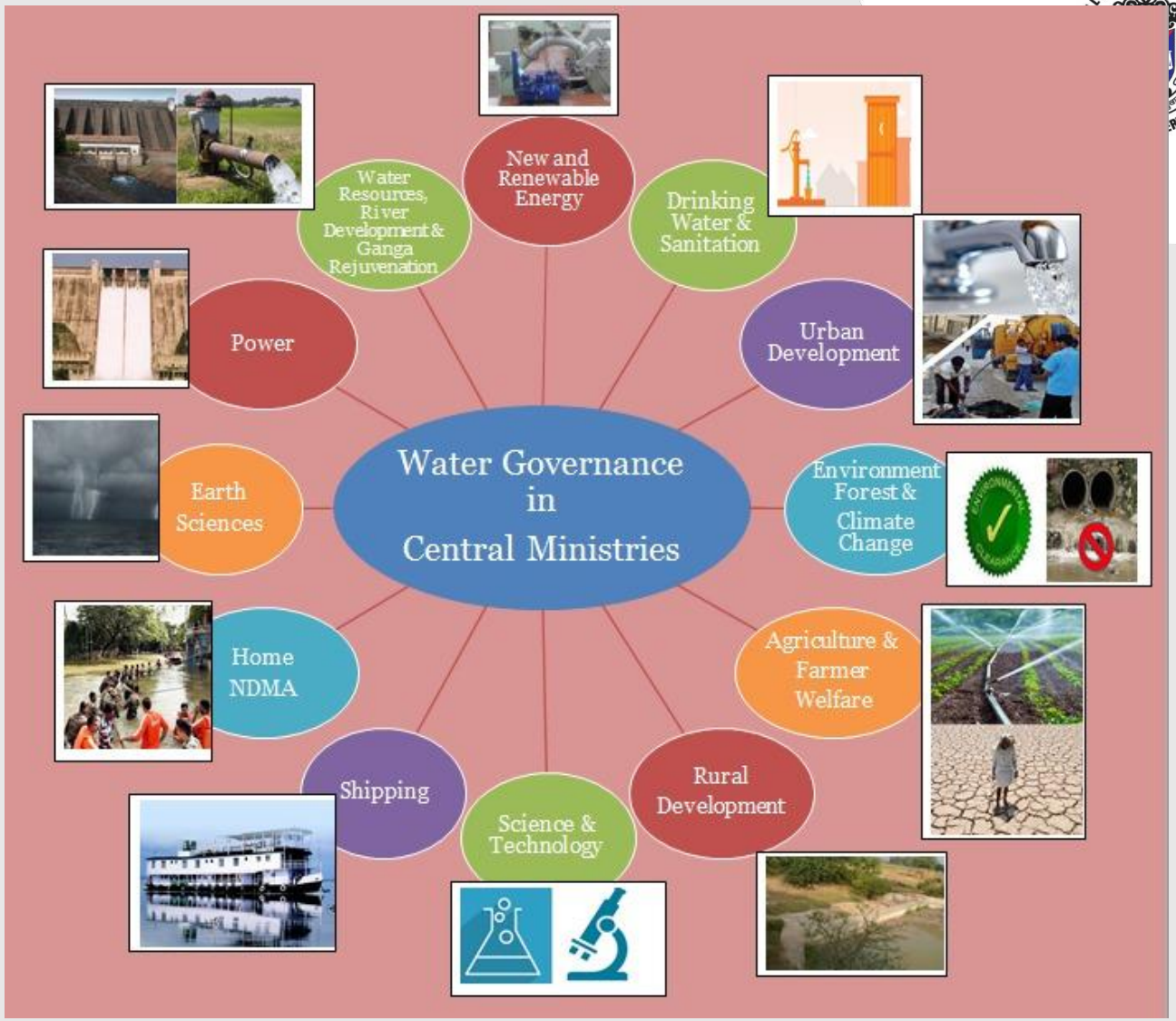


Source: https://nwa.mah.nic.in/sdmc/governance/01_goi.htm/

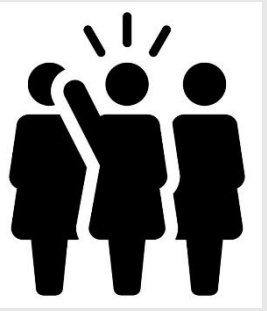
Gender Inclusion in Good Governance

Gender Issues in Irrigation Activities

Gender Issues for Improvement	Expected Outcomes
1. Representation and participation in decision making by women and men and the youth at all level.	Improved water resource management
2. Build capacity of men and women to support women to take up leadership roles.	Improved delivery of irrigation services and irrigation system.
3. Representatives of water use & water users will at least 40% women.	
4. Women should constitute at least 40% of trainees in technical training related to irrigation operation, management and development of infrastructure.	

Source:- https://www.slideshare.net/HI-AWARE/gender-and-water-governance

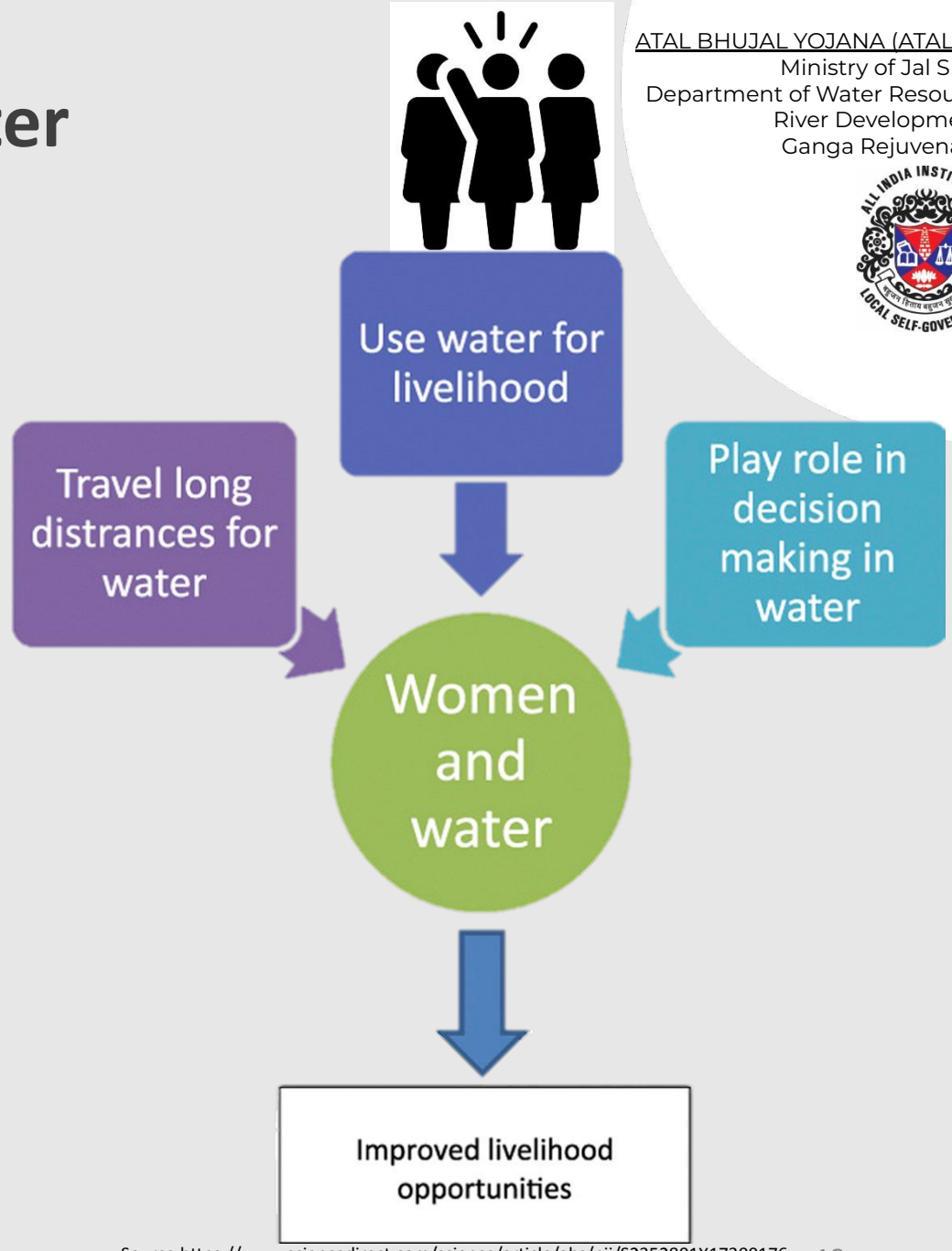
Gender Inclusion in Governance – Involvement of Women



1. Presence of women 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

Gender Mainstreaming in Groundwater Management

1. **Conducting gender-disaggregated assessments of groundwater resources**, including assessing the differential impacts of groundwater use on women and men.
2. **Encouraging the participation of women** in groundwater management and decision-making processes, **including providing training and capacity-building opportunities.**
3. **Recognizing and addressing gender-based barriers** to accessing and using groundwater resources, including legal and institutional barriers.
4. **Promoting gender-equitable access to groundwater resources,** including recognizing women's rights to land and water.
5. **Encouraging the development of gender-sensitive groundwater policies, regulations, and management plans.**



Source:https://www.sciencedirect.com/science/article/abs/pii/S2352801X17300176

Gender Inclusion in Governance – Involvement of Women

In India (2011)

75% Women in agriculture

59% Men in agriculture

In Haryana (2011)

55.9% Women in agriculture

41.6% Men in agriculture

High Participation of women in agriculture activities thus women is involved as major stakeholder in Groundwater Management

Women in Agriculture in Haryana

Source: Director of Census Operations, Haryana
Source:-https://www.indiawaterportal.org/articles/womens-involvement-participatory-water-institutions-eastern-india

Strengthening Institutional Capacity to ensure Women and men benefit equitably

Institutional commitment to promote gender-sensitive working conditions for laborers	Institutional awareness and capacities to promote gender equality.	Vocational training and skills development under the Community Infrastructure Fund.	Construction of community halls.
• Mandating equal wages for equal value of work.	• The project management unit (PMU) should include dedicated staff positions for community development and social and gender equality.	• Vocation training according to the funds to be provided to men and women both increase involvement of women	• Space should be provided for public participation, cultural programs, and cultural exchange.

Source:- https://www.adb.org/sites/default/files/publication/160696/gender-mainstreaming-ind-urban-water.pdf

Learning Resources

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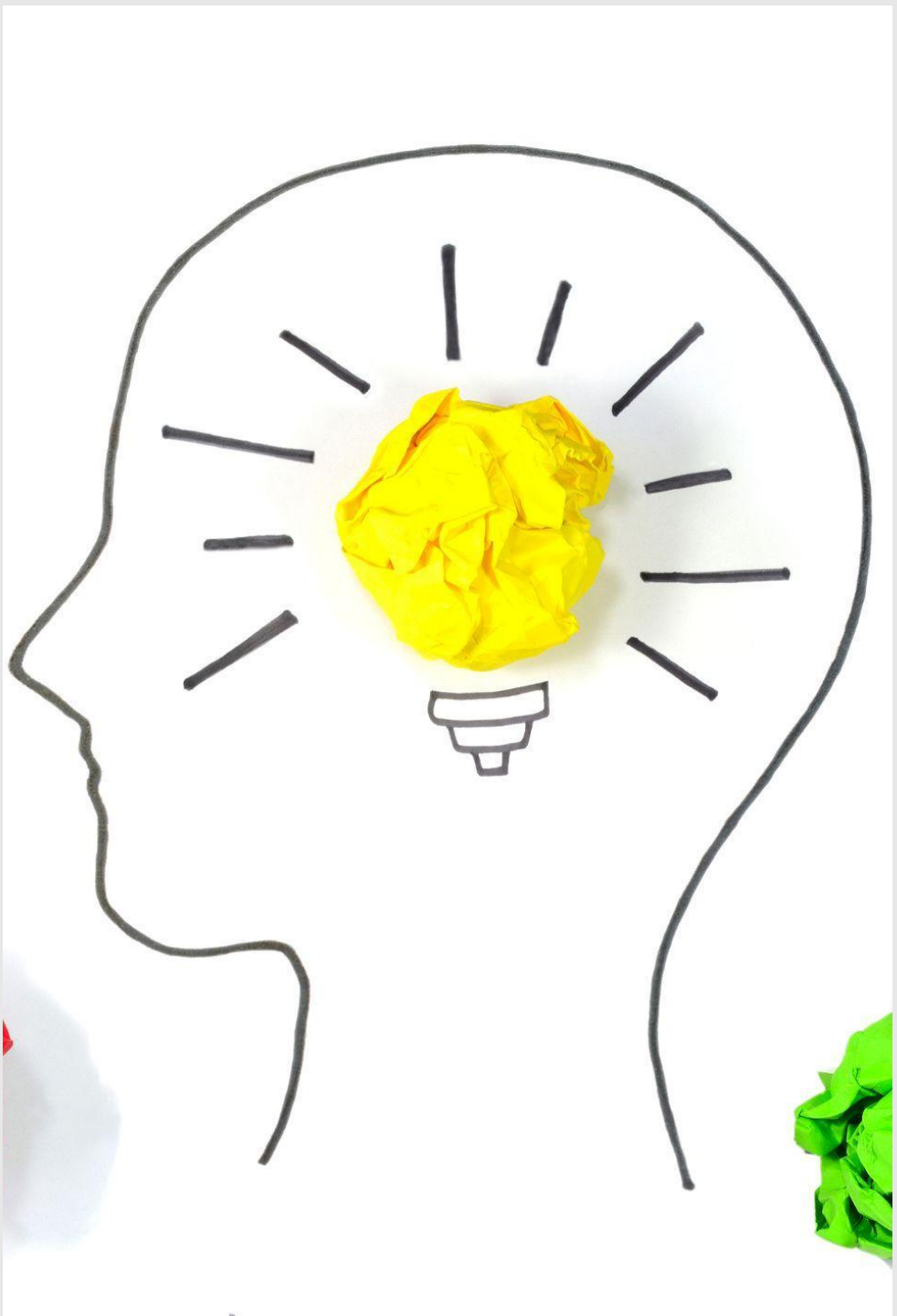


Convergence under Atal Bhujal Yojana

Session - 5

Benefits of Convergence

1. Alignment in the implementation of various government schemes / programs and obviation of duplication of activities
2. Improvement in the effectiveness of public financing on groundwater
3. The plans prepared under this program will be an essential component of the Gram Panchayat Development Plans.
4. Improvement in management by way of moving away from ad hoc, uncoordinated investments to more coordinated investment
5. Sustainability in groundwater management

Process of Convergence

1. Formulation of Annual State Allocation Plan
2. Convergence of programs / schemes for implementation of investment actions of approved WSPs
3. Funding to only annually updated and approved WSPs
4. Aggregation of the district-level allocation plans to formulate State Allocation Alan
5. Compilation of State Allocation Plan by Project Implementation Agency (PIA) / State Project Monitoring Unit (SPMU)

Convergence with different schemes

Name of the Scheme	Central/State Government Deptt.	Possible activities that can be taken up	Funds
Fifteenth Finance commission SFCs	GP,PS,ZP	Greywater Management, drainage system, etc.	As per guidelines of the FFC
Swachh Bharat Mission-Grameen(SBM-G)	Deptt. Of Drinking Water and Sanitation, M/o Jal Shakti	Greywater management-soak pits (individual/community) waste stabilization ponds, etc.	As per guidelines of the Scheme
Non-Con. Energy	Centre/State	Solar energy &link to grid	As per guidelines
Environment & Forests	Centre/State	Permission & Forestation	As per guidelines

Source: http://www.indiaenvironmentportal.org.in/files/india-climate-5-water-DEFRA.pdf/

Convergence with different schemes

Name of the Scheme	Central/State Government Dept.	Possible activities that can be taken up	Funds
Integrated watershed Management Programme (IWMP).	D/o Land Resources	Watershed management/ /artificial recharge, creation/ augmentation of water bodies, etc.	As per guidelines
Repair, Renovation and Restoration of water bodies	D/o Water Resources, River Development and Ganga Rejuvenation	Restoration of larger water bodies	As per guidelines
Rashtriya Krishi Vikas Yojana (RKVY)	M/o Agriculture, Cooperation and Farmers Welfare	Watershed related works	As per guidelines
Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)	M/o Agriculture, Cooperation and Farmers Welfare	Provision of micro-irrigation for various water-intensive crops to reduce drawl of water from aquifers	As per guidelines
Compensatory Afforestation fund Management and Planning Authority	M/o Environment, Forests and Climate Change	Afforestation, regeneration of forest ecosystem, watershed development, etc.	As per guidelines

Source: http://www.indiaenvironmentportal.org.in/files/india-climate-5-water-DEFRA.pdf/

Convergence with different schemes

Name of the Scheme	Central/State Government Dept.	Possible activities that can be taken up	Funds
Samgra Shikas	M/o HRD	Provisions of drinking water in schools	As per guidelines
Aspirational Districts Prog.	Niti Aayog	Water conservation activities taken up under discretionary funds with DM	As per guidelines
District Mineral Development Fund	State	water conservation activities on large scale	As per guidelines
MPLAD MLAAD	MoPIS State	In village Infrastructure In village Infrastructure	As per guidelines
Grant under Article 275(1) of the Constitution /TSS DAY-NRLM / SRLM	MoTA MoRD	In village Infrastructure Developing women Entrepreneurs and SHG led entrepreneurs for water service scheme	As per guidelines

Source: http://www.indiaenvironmentportal.org.in/files/india-climate-5-water-DEFRA.pdf/

Convergence with different schemes

Name of the Scheme	Central/State Government Dept.	Possible activities that can be taken up	Funds
SPMRM	M/o RD	24x 7 Piped water supply(desired 70 litres per capita per day of safe drinking water for every household through out the year	As per guidelines
Jal Jeevan Mission	MoJS	To provide Functional Household Tap Connection including Rural areas	As per guidelines
MGNREGA	MoRD	All water conservation activities under NRM	As per guidelines
DDU-GKY	MoRD	Placement linked skill manpower	As per guidelines

Source: http://www.indiaenvironmentportal.org.in/files/india-climate-5-water-DEFRA.pdf/

Interdepartmental Convergence and Facilities In Haryana

Agriculture and Farmer Welfare Department

- GP level sessional crop cultivation, irrigation, production and intervention details.
- GP level details of irrigation type, sources, numbers, operational modes.
- Annual target details of various schemes.
- MPMV
- Soil conservation
- Crop extension and diversification

Schemes under AFWD

1. **Mera Pani Meri Virasat(MPMV)**

Direct Seeded Rice (DSR), Crop Diversification

2. Scheme for Management of Crop Residue.

Super Seeding/Happy Seeder/Zero Tillage

Source:- Atal Bhujal Yojana Haryana, Peoples Science Institute, SPMU

Interdepartmental Convergence and Facilities In Haryana

Micro Irrigation & Command Area Development Authority (MICADA)

- GP level MI data (sprinkles, mini sprinklers, drip, UGPL). Annual action plan
- Micro Irrigation

Schemes Under MICADA

1. PMKSY(Per Drop More Crop)

Drip & Sprinkler Irrigation System 85% subsidy given on installation of micro irrigation system for converting from flood irrigation to micro irrigation and when using irrigation water from Rejuvenated pond system + **15% additional subsidy given by Haryana State**

2. PMKSY(Per Drop More Crop) "Other Intervention“

On Farm Water Tank for use of Micro Irrigation.

Individual Farmers

- Construction of Water Tank - 70% Subsidy
- Solar Pump - 75% Subsidy
- Mini Sprinkler / Drill - 85% Subsidy

Group of Farmers

- Construction of Water Tank - 85% Subsidy
- Solar Pump - 75% Subsidy
- Mini Sprinkler / Drill - 85% Subsidy

Source: Atal Bhujal Yojana Haryana, Peoples Science Institute, SPMU

Interdepartmental Convergence and Facilities In Haryana

Soil & Conservation Department

- GP level sessional crop cultivation, irrigation, production and intervention details.
- GP level details of irrigation type, sources, numbers, operational modes.
- Annual target details of various schemes.
- MPMV
- Soil conservation
- Crop extension and diversification

Schemes under Soil & Conservation Dept.

1. Rashtriye Krishi Vikas Yoajan (RKVY)

A. Underground Pipe line (UGPL)
B. Recharge Bore/Pits/Injection Wells

2. IWDMP – Integrated Watershed Development

Rooftop Rainwater Harvesting, Check dam, Trench, Renovation of Pond

Source:- Atal Bhujal Yojana Haryana, Peoples Science Institute, SPMU

Interdepartmental Convergence and Facilities In Haryana

Public health and engineering Department	•• GP level drinking water status with details of source and coverage, GP level water quality data of geotagged sources, etc. Incorporating Atal Jal OW in JJM water quality testing agenda. Institutional convergence in form of VWSC and WSSO •• JJM •• SBM
Development and panchayats department	• GP level demographic, livelihood and other necessary data. SECC data. MGNREGA (NRM) cumulative progress data and annual action plan. MGNREGA • GPDP • 15th FC resources
Revenue and Disaster Management Department Haryana	• GP level GP area, all seasonal crop cultivation and land use data with exclusive mention of irrigation source crop wise, details of irrigation structures and industrial outlays

Source:- Atal Bhujal Yojana Haryana, Peoples Science Institute, SPMU

Interdepartmental Convergence and Facilities In Haryana

Development and panchayats department

- GP level demographic, livelihood and other necessary data. SECC data. MGNREGA (NRM) cumulative progress data and annual action plan. MGNREGA
- GPDP
- 15th FC resources

Schemes under Panchayati Raj Engineering Department

1. **Amrit Sarovar & Model Pond**

Pond Renovation & Rejuvenation

Interdepartmental Convergence and Facilities In Haryana

Rural Development Department	•• GP level PMKSY - watershed data, soil and water conservation data, NRLM •• PMKSY - Watershed •• MGNREGA •• NRLM
Central ground water board	• GP level WL and WQ data with sessional updation. Technical support in form of GW estimation. Data of artificial recharge master plan
Ground water cell - I&WRD	• GP level WL and WQ data with sessional updation. Preparation in/of DLI 1 and DLI 5

Source:- Atal Bhujal Yojana Haryana, Peoples Science Institute, SPMU

Interdepartmental Convergence and Facilities In Haryana

Horticulture Department	•• GP level horticulture data with specific mention of plantation/ vegetables and alike area.
Department of Economic and Statistical Analysis, Haryana	• GP level Demographic data with relevant categorization. GP level data of livelihood forms
Animal Husbandry & Dairying Department	• GP livestock population with relevant categorization, water consumption data of respective breed and form

Source:- Atal Bhujal Yojana Haryana, Peoples Science Institute, SPMU

Interdepartmental Convergence and Facilities In Haryana

Horticulture Department

- GP level horticulture data with specific mention of plantation/ vegetables and alike area.

Schemes under Horticulture Department

IHD Scheme (Integrated Horticulture Development)

1. Plastic Mulching, Poly House, Fruit Plantation (Orchard), Vegetable & Spices and Mushroom Cultivation.

1. Individual/Community Water Pond

Source:- Atal Bhujal Yojana Haryana, Peoples Science Institute, SPMU

Interdepartmental Convergence and Facilities In Haryana

Forests Department, Haryana

- GP level forest data.
- Plantation and afforestation

Directorate of Information, Public Relations & Languages

- Facilitation of coverage and dissemination of Atal Bhujal Yojana activities and approach

Department of School Education

- Providing NOCs for establishing the HMN. Support in conducting school level water education trainings
- Water Awareness & Education

Schemes under Education Department

1. **Siksha Abhiyan**

Surface & Rooftop Rainwater Harvesting Structure

Source:- Atal Bhujal Yojana Haryana, Peoples Science Institute, SPMU

Interdepartmental Convergence and Facilities In Haryana

Nehru Yuva Kendra Sangathan	Department of renewable energy Haryana	Haryana State Electricity Board (HSEB)
•• Support in conducting GP level water awareness program •• Water Awareness	• GP level data on solar pumps • PM-Kusum	• GP level data on solar pumps and agricultural connections

Source:- Atal Bhujal Yojana Haryana, Peoples Science Institute, SPMU

Cumulative list of Schemes under different dept.

S.NO	Convergence Department	Activity type/Interventions	Schemes Name
1	MICADA	Drip & Sprinkler Irrigation System 85% subsidy given on installation of micro irrigation system for converting from flood irrigation to micro irrigation and when using irrigation water from Rejuvenated pond system + 15% additional subsidy given by Haryana State	PMKSY(Per Drop More Crop)
2	MICADA	On Farm Water Tank for use of Micro Irrigation	PMKSY(Per Drop More Crop) "Other Intervention"
3	Agriculture & Farmer Welfare Department	Direct Seeded Rice (DSR), Crop Diversification	Mera Pani Meri Virasat(MPMV)
4	Agriculture & Farmer Welfare Department	Super Seeding/Happy Seeder/Zero Tillage	Scheme for Management of Crop Residue.
5	Soil & Conservation Department	Underground Pipe line (UGPL)	Rashtriye Krishi Vikas Yoajan (RKVY)
6	Horticulture Department	Plastic Mulching, Poly House, Fruit Plantation (Orchard), Vegetable & Spices and Mushroom Cultivation.	IHD Scheme
7	Horticulture Department	Individual/Community Water Pond	IHD Scheme
8	Rural Development	Rooftop Rainwater Harvesting Structure	Integrated Watershed Management Programme (IWMP)
9	Rural Development	Recharge pit/shaft	Integrated Watershed Management Programme (IWMP)
10	Rural Development	Pond Renovation & Rejuvenation	Amrit Sarovar, MGNREGA
11	Panchayati Raj Engineering Department	Pond Renovation & Rejuvenation	Amrit Sarovar & Model Pond
12	Soil & Conservation Department	Rooftop Rainwater Harvesting, Check dam, Trench, Renovation of Pond	IWDMP
13	Soil & Conservation Department	Recharge Bore/Pits/Injection Wells	Rashtriye Krishi VikasYoajan(RKVY)
14	Irrigation & Water Resource Development	Injection Well	Recharge Works
15	Education Department	Rooftop Harvesting Structure	Siksha Abhiyan

Source:- Atal Bhujal Yojana Haryana, Peoples Science Institute, SPMU

INTERNATIONAL YEAR OF

MILLETS

2023

Source:- https://www.fao.org/millets-2023/en

International Year of Millets - 2023

Benefits of Millets:

. Millets are highly adaptive to a wide range of ecological conditions and thrive well in rain-fed; arid climate and they have minimal requirement of water, fertilizers, and pesticides.

. Millets are used for dual purposes as food as well as fodder, which make it more farming efficient.

. Millet cultivation helps to reduce the carbon footprint.

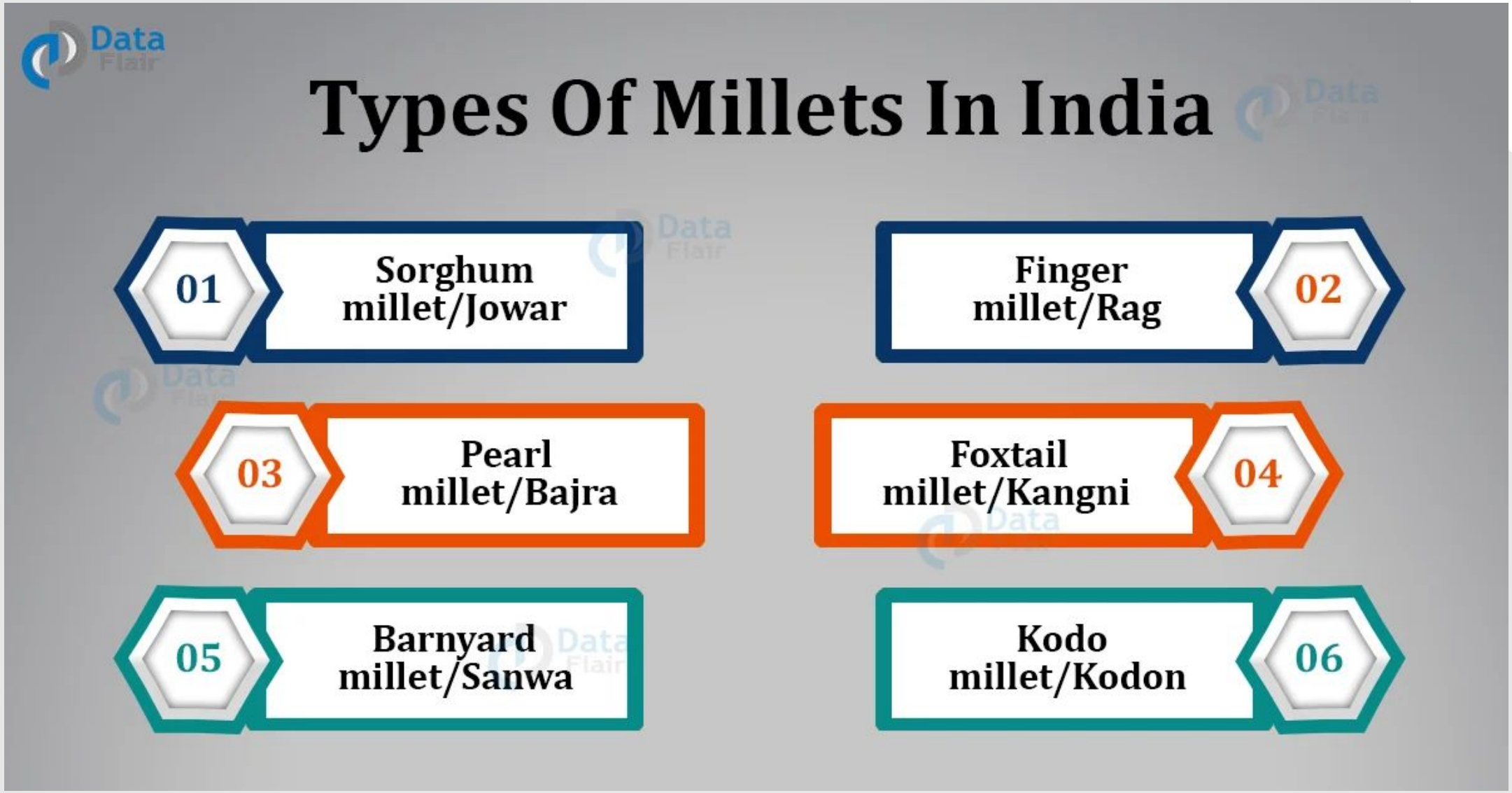
. Health-promoting nutritious crop: Compared to other cereals they have superior micronutrient profile and bioactive flavonoids.

. In India, Millet is generally consumed with legumes, which creates mutual supplementation of protein, increases the amino acid content, and enhances the overall digestibility of protein.

. Millet based value-added products in ready to cook, ready to eat category are easily accessible and convenient to the urban population.

Source:- Atal Bhujal Yojana Haryana, Peoples Science Institute, SPMU

International Year of Millets - 2023



Source:- https://data-flair.training/blogs/millets-in-india/

International Year of Millets - 2023

Video Source:- https://www.youtube.com/watch?v=HvOFdnIb_tw

International Year of Millets - 2023

Video Source:- https://www.youtube.com/watch?v=HvOFdnIb_tw

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/

Thank You

on behalf of

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