"Model Bill to Regulate the Ground Water Development and Ground Water Resource Estimation as per GEC 2015 in context to Ladakh"

by

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Scientist 'D', CGWB, Jammu

Contents of the Presentation

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- Salient features of Groundwater Model bill 2005
- Salient features of Proposed Groundwater (Sustainable Management) Bill, 2016
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- Ground Water Resource Estimation (GEC 2015)
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Background

1970 to 2005

- In 1970, in view of depletion in ground water resources in some parts of the country, Govt. of India circulated 'Groundwater (Control and Regulation) Act', 1970 to State Governments for adoption and enactment.
- It was based on Common Laws, Rules and legislation of the country like Criminal Procedure Code, 1898 etc..
- It provided for constitution of State Groundwater Authority with power to regulate groundwater extraction.
- The Bill was revised in 1972, 1996 and 2005.
- In 2005, new chapter on rainwater harvesting was introduced which provided for implementation of Groundwater Recharge measures.

Salient features of Model Bill, 2005

- The Model Bill, 2005 proposes following actions in notified areas–
  - Grant of permit for sinking a new bore well.
  - Registration of existing bore well-owners.
  - Registration of Drilling Agencies
  - Restrictions on the depth and diameter of bore wells.
  - Restriction on purpose of use of ground water.
  - Registration of new users in non-notified areas.
  - Adoption of rainwater harvesting.
  - Penalty for offences- Fine up to Rs. 5,000/-, Compounding of offences may lead to more fine and imprisonment up to 6 months.

Background… Why New Model Bill?

- Overbearing power of landowners on access to and control over groundwater leads to failure of regulation in tackling over-extraction, contamination and protection on a larger scale.
- Direct links between rights to groundwater and land ownership excludes the vast number of landless people from a direct stake in the resource.
- Existing groundwater legal regime fails to incorporate the many legal developments and Supreme Court pronouncements that have taken place over the past few years .
- Existing groundwater legal regime fails to integrate the fundamental right to water that has been a part of Indian law for the past few decades.

Background… contd.

- Keeping the above in view, Planning Commission in 2011 formulated a draft Model Bill for the ‘Conservation, Protection and Regulation of Groundwater’

- MoWR, RD & GR constituted a committee in October, 2015 to review the Model Bills under the chairmanship of Dr. Mihir Shah, former Member (Planning Commission)
- Members :
  - Sh. Sushil Gupta, former Chairman, CGWB,
  - Dr. M.K. Sinha, Director, CWPRS,
  - Dr. Himanshu Kulkarni, Director, AQWADAM,
  - Sh. Videh Upadhyay, and
  - Prof. Phillip Cullet, legal Experts
  - Sh. Rana Chatterjee, Scientist ‘D’, CGWB- **Member Secretary**
- The Terms of the Reference of the Committee included incorporation of the principle of ground water being held in pubic trust, mandatory recharge, conjunctive use of surface & ground water, water conservation practices, polluter pay principle, pricing of ground water, participatory management etc.

Model Groundwater (Sustainable Management) Bill, 2016

- Objective - Protection, conservation, regulation and management of ground water in a sustainable manner
- Guided by the National Water Policy, 2012 and the draft National Water Framework Bill, 2016
- Introduces
  - Right of Water for Life
  - Principle of Subsidiary & decentralization upto village level
  - Ground water as a common pool resource held in public trust, with State as the public trustee of groundwater.

Model Groundwater (Sustainable Management) Bill, 2016

- Stipulates non-discrimination and Equity on access to groundwater across the various sects of the society.
- Stresses on sustainable management of ground water in conjunction with surface water
- Ground water use has been prioritized -
  - First priority is right to water for life,
  - followed for allocation for achieving food security, supporting sustenance agriculture, sustainable livelihoods and eco-system needs.
  - After meeting above priorities, available ground water may be allocated for other uses.

Model Groundwater (Sustainable Management) Bill, 2016

- Demarcation of Ground Water Protection Zones based on assessment of dynamic ground water resources. The appropriate governments have to protect and conserve the ground water protection zones in the context of Ground Water Security Plans.
- The objective of Groundwater Security Plan is to ensure - sufficient quantity of safe water for life, water security during droughts, floods etc, and desirable quality of ground water.
- Provides an institutional framework for implementation of the provisions of the Bill with Gram Panchayat and Municipality/ Municipal Committee as its basic unit, followed by block, district and State level committees

Model Groundwater (Sustainable Management) Bill, 2016

- Functions at Gram Panchayat and Municipal level are – determination of minimum quantity of water for life, preparation of panchayat/ municipal level security plan, registration of wells, collection of information regarding drilling and construction of wells etc.
- District Groundwater Council will grant authorization for construction of wells and State Groundwater Advisory Council is overall advisory body in the State regarding all the matters pertaining to the implementation of the Bill.
- Proposed institutional framework ensures appropriate management of ground water from local level to State level.
- Emphasizes on the duties of ground water users which would include rainwater harvesting, recycling and reuse of ground water, prevention and mitigation of water-logging etc.

Model Groundwater (Sustainable Management) Bill, 2016

- The Bill has three schedules on – demarcation and notification of Groundwater Protection Zones, procedure for Groundwater Authorizations and procedure for Social and Environmental Impact Assessment and Public Consultation.
- Basic improvement over Model Bill, 2005 is that while Model Bill, 2005 focuses on groundwater regulation through State level machinery. Model Bill, 2016 stresses on holistic management of groundwater resources on the broader perspective of ecological and social setup through decentralized institutional framework from local to state-level.

Model Bill 2005 vis-à-vis Model Bill, 2016

Model Bill 2005	Model Bill 2016
PURPOSE	
A Bill to regulate and control the Development and Management of Ground Water and matters connected therewith or incidental thereto.	A Bill to restore and ensure groundwater security through availability of sufficient quantity and appropriate quality of groundwater to all stakeholders in rural and urban areas.

Model Bill 2005 vis-à-vis Model Bill, 2016

Model Bill 2005	Model Bill 2016
OBJECTIVE	
No such objective has been defined other than purpose of the Bill.	The objectives of this Bill are to ensure that groundwater is protected, conserved, regulated and managed
RIGHT TO WATER	
No such section is present in the Bill.	• Every person shall have access to groundwater without any discrimination, including among others, caste, creed, religion, community, class, gender, age, disability, economic status, land ownership and place of residence. •The state at all levels is the public trustee of groundwater.

Model Bill 2005 vis-à-vis Model Bill, 2016

Model Bill 2005	Model Bill 2016
DOCUMENTATION	
The Authority shall maintain and upkeep the data-base on ground water related information.	• Dynamic resources assessments to be conducted by CGWB and State Govt. • The appropriate govt. shall prepare and oversee the implementation of a '*Groundwater Security Plan'(GSP)* to be based on progressively available groundwater resources / aquifer information in consultation with elected local bodies, information and monitoring cells and supporting institutions.

Model Bill 2005 vis-à-vis Model Bill, 2016

Model Bill 2005	Model Bill 2016
GOVERNANCE	
• The State Govt/UT shall, establish a Ground Water Authority. • The Authority shall function under the overall control and supervision of the State/UT Govt. • The Authority or any person authorized, shall have power to carry out all such activities which may be required for proper implementation of the provisions of the Bill.	**Urban Areas:** *I. Municipal Water Management Committee* Main function – Determination of minimum quantity of Water for Life, Preparation of Ward Ground water Security Plan (GSP), Determination of Groundwater Protection zones, Registration of wells **Rural Areas:** *I. Gram Panchayat* Groundwater Sub-Committee as part of the Village Water and Sanitation Committee. Main function – Same as Municipal Water Management Committee II. *Block Panchayat* Main function – Same as Village W&S Committee at Block level

Model Bill 2005 vis-à-vis Model Bill, 2016

Model Bill 2005	Model Bill 2016
GOVERNANCE..contd.	
	District Groundwater Council Main Functions – Granting authorization to gw users **State Groundwater Advisory Council** Main Functions – Overall advisory body in the state for the enactment of gw legislation

Model Bill 2005 vis-à-vis Model Bill, 2016

Model Bill 2005	Model Bill 2016
WATER QUANTITY	
• Authority will take steps to ensure that exploitation of ground water resources does not exceed the natural replenishment to the aquifers. • Wherever, there is mismatch, steps will be taken to ensure augmentation of ground water resources in addition to regulatory measures.	• Every person has a right to sufficient quantity of safe water for life. • Groundwater resources (aquifers) shall be protected from such activities that impact the equity of access and sustainability of the resource. •Water use has been prioritized. •Conducting Annual Water Audit

Model Bill 2005 vis-à-vis Model Bill, 2016

Model Bill 2005	Model Bill 2016
WATER QUALITY	
Authority can refuse a permit for extraction keeping in mind the quality of ground water with reference to use.	Every drinking water agency supplying groundwater shall comply with the Bureau of Indian Standards specifications on water quality.
PRICING	
No such information is present in the document.	Groundwater Charges to be paid by: Industrial or bulk groundwater users Funds collected under this section shall be used for groundwater conservation and augmentation activities

Model Bill 2005 vis-à-vis Model Bill, 2016

Model Bill 2005	Model Bill 2016
MINING	
No such information is present in the document.	Any mining activity should take adequate measures for protection of surface and groundwater to minimise the adverse effects.

Model Bill 2005 vis-à-vis Model Bill, 2016

Model Bill 2005	Model Bill 2016
NEW TECHNOLOGIES	
• Adoption of rain water harvesting • Watershed management in rural areas • Rain Water Harvesting in all Govt. sponsored developmental schemes • Rain water harvesting structures in all residential, commercial and other premises having an area of 100 Sq. mt. or more. • Mass awareness & training programmes to promote rain water harvesting	• Encourage rainwater harvesting and catchment conservation • Integrated natural resources conservation, use and regulation for the augmentation of groundwater resources • Rooftop rainwater harvesting structures in the building plan of an area of 50 m^2 or more. • Encourage recycling and re-use of water • Change of cropping pattern in Groundwater Protection Zones where water intensive cash crops are grown

Model Bill 2005 vis-à-vis Model Bill, 2016

Model Bill 2005	Model Bill 2016
NOTIFICATION OF AREAS	
Provision of Notification and de-Notification by State Ground Water Authority to control and/or regulate the extraction or the use or both of ground water in any form in any area	• State Groundwater Agency shall demarcate groundwater protection zones. • Groundwater protection zones will be based on the latest dynamic resources assessments • Appropriate measures regarding regulation on the extraction and use of groundwater, rules regarding afforestation-deforestation, prohibition of waste disposal, regulation of mining leases will be adopted in Notified areas, safe distance between wells, pumping regulation of existing wells etc.

Model Bill 2005 vis-à-vis Model Bill, 2016

Model Bill 2005	Model Bill 2016
REGISTRATION OF USER	
• Existing user of ground water shall get the ground water structure registered	•Panchayat / Municipal Groundwater Committee shall register all wells

Model Bill 2005 vis-à-vis Model Bill, 2016

Model Bill 2005	Model Bill 2016
EXTRACTION FROM NOTIFIED AREAS	
• Grant of a permit to sink a well in the notified area • Permit will include mandatory provision of artificial recharge structures	• No one shall Extract groundwater for industrial use or infrastructure projects without an authorization issued by the appropriate govt. • Authorizations for industrial, commercial or other bulk uses of groundwater shall be granted in a Groundwater Protection Zone only if such uses are in conformity with the provisions of the GSP

Model Bill 2005 vis-à-vis Model Bill, 2016

Model Bill 2005	Model Bill 2016
REGISTRATION OF USER OF NEW WELLS	
•All wells sunk in the State/Union Territory shall have to be registered.	• Panchayat/ Municipal Groundwater Committee shall register all wells

Model Bill 2005 vis-à-vis Model Bill, 2016

Model Bill 2005	Model Bill 2016
REGISTRATION OF DRILLING AGENCIES	
• Every rig owner shall register his machinery with the Authority.	• District Groundwater council shall register drilling agencies • Panchayat/ Municipal Groundwater Committee shall obtain a log and other related information from drilling agencies/ persons engaged in well construction.
TRANSPARENCY AND ACCOUNTABILITY	
•No such information is present in the document.	• Provision for social and environment impact assessments. • Duty of the appropriate govt to create an effective, appropriate and citizen-friendly transparency regime for the present Bill. • Social audits of activities undertaken in pursuance with this Bill.

Model Bill 2005 vis-à-vis Model Bill, 2016

Model Bill 2005	Model Bill 2016
PENALTY	
• Provision of penalty for users – first offence with fine which may extend to Rs. Five Thousand; and for subsequent offence, with imprisonment for a term which may extend to six months, or with fine which may extend to Rs. Ten Thousand or both. • Companies – Every person who at the time of the commission of offence was in charge of, or was responsible to the company, shall be deemed to be guilty of the offence	• Any activity effecting availability and quality of ground water - imprisonment, which may extend to one year and six months or with a fine, which may extend to one lakh rupees or with both. • Eextraction of groundwater from a groundwater protection zone: Fine not less than One lakh rupees and upto Ten lakh in some cases. imprisonment not less than six months which may extend to three years •Companies – Every person who at the time of the commission of offence was in charge of, or was responsible to the company, shall be deemed to be guilty of the offence

Impact of Model Groundwater (Sustainable Management) Bill, 2016

- Model Bill, 2016 provides that Groundwater, as a common pool resource, is the common heritage of the people held in public trust. In its natural state, groundwater is not amenable to ownership by the state, communities or persons.

- The Bill follows the principle of subsidiarity ensuring the participation of the lowest level functionary in decision taking process.

- Proposes a new legal framework that will ensure availability of ground water for livelihood - in effect ensuring that overwhelming majority of small farmers' will have water available for their crops, and resulting in effective regulation of large-scale groundwater use.

- States would find it more acceptable since it reduces authoritarian principles of earlier Model Bills and is based more on people's participation.

GROUND WATER RESOURCES ESTIMATION

GEC 2015

Central Level Expert Group
State Level Committee
Ground Water Assessment Cells

GROUND WATER RESOURCES ESTIMATION

Aims at Computing

Total Ground Water Availability

GEC 2015

GROUND WATER RESOURCES ESTIMATION

Total Availability of Ground Water in an Area

Is sum of

- Total Availability in Unconfined Aquifers
- Total Availability in Semi-Confined Aquifers
- Total Availability in Confined Aquifers

Total Availability of Ground Water in an Area

In Hard Rock Areas

- Deeper Aquifers are normally Semi-Confined
- Recharge to the deeper aquifers is normally from the top unconfined aquifer.

In Soft Rock Areas

- Some of the Deeper Aquifers are Semi-Confined
- Recharge to some of the deeper aquifers is from the top unconfined aquifer.

GROUND WATER RESOURCES ESTIMATION

Total Availability of Ground Water in an Aquifer

Is Sum of

- Dynamic Ground Water Resource of that Aquifer.
- Static / In-storage Ground Water Resource of that Aquifer.

GROUND WATER RESOURCES ESTIMATION

GEC 2015

Dynamic Ground Water Resource

The Ground Water Resource which replenishes every year.

GROUND WATER RESOURCES ESTIMATION

Static/ In-storage Ground Water Resource

- The Ground Water Resource that is not replenished every year.
- The Ground Water that is available below the Dynamic Zone.
- That is available Below pre monsoon water level.
- One Time Resource.

GROUND WATER RESOURCES ESTIMATION

Static/ In-storage Ground Water Resource

- Because it is a one time Resource, It should not be planned for development.
- But in Severe drought Conditions, it can be exploited for drinking purpose only with a plan to replenish the resource in the coming excessive rainfall years.

GROUND WATER RESOURCES ESTIMATION

Estimation of Ground Water Resources

Based on

- Ground Water Estimation Committee – 2015
- Recommendations of R&D Advisory Committee From Time to Time if any

GEC 2015

GROUND WATER RESOURCES ESTIMATION

Ground Water Assessment Unit

Areas where Principal Aquifer is Alluvium	Administrative Boundaries
Areas where Principal Aquifer is not Alluvium	Hydrological Boundaries

GROUND WATER RESOURCES ESTIMATION

Ground Water Assessment Sub-Units

Hilly Areas	Recharge is Not Possible
Ground Water Worthy Areas	Recharge is Possible
Poor Ground Water Quality Areas	Quality is Beyond Permissible Limits
Good Ground Water Quality Areas	Quality is Within Permissible Limits
Command Areas	Command of any Major or Medium Irrigation Project
Non-Command Areas	Not in the Command of any Major or Medium Irrigation Project

Estimation of Ground Water Resources of Unconfined Aquifer

Basic Equation

Inflow-Outflow=Change in Storage

Inflow Components

- Rainfall Recharge
- Recharge From canals
- Recharge From Surface Water Irrigation
- Recharge From Ground Water irrigation
- Recharge From Tanks & Ponds
- Recharge From Water Conservation Structures
- Lateral Inflow across Boundaries
- Sub surface inflow from hydraulically connected streams
- Vertical inter aquifer inflow

Outflow Components

- Gross Ground Water Extraction
- Lateral Outflow across Boundaries
- Sub surface Outflow from hydraulically connected streams
- Vertical inter aquifer Outflow
- Evaporation
- Transpiration

GROUND WATER RESOURCES ESTIMATION

THE MAIN COMPONENTS ARE

- COMPUTATION OF GROUND WATER EXTRACTION
- COMPUTATION OF RECHARGE DUE TO OTHER SOURCES
- COMPUTATION OF INFLOWS/OUTFLOWS
- COMPUTATION OF RAINFALL RECHARGE
- COMPUTATION OF SUMMARY DETAILS

GROUND WATER RESOURCES ESTIMATION

COMPUTATION OF SUMMARY DETAILS

- Annual Extractable Ground Water Resources
- Current Stage Of Ground Water Extraction
- Validation of the Assessment by Water Level Trend
- Categorization For Future Ground Water Extraction
- Ground Water Allocation For Future Domestic Water Use
- Net Annual Ground Water Availability For Future Use.
- Additional Potential Resources.
- In-Storage Ground Water Resources.

GEC 2015

GROUND WATER RESOURCES ESTIMATION

COMPUTATION OF RESOURCES OF OTHER AQUIFERS

- Dynamic Ground Water Resources of Confined & Semi Confined Aquifers in the Assessment unit.
- Static/ In-storage Ground Water Resources of Confined & Semi Confined Aquifers in the Assessment unit.

GROUND WATER RESOURCES ESTIMATION

Estimation Of Recharge Due To Rainfall

1. Rainfall infiltration factor method
2. Water level fluctuation method

GROUND WATER RESOURCES ESTIMATION

PERCENT DIFFERENCE

$$PD = \frac{R_{Rf}(wtfm) - R_{Rf}(rifm)}{R_{Rf}(rifm)} \times 100$$

Where

PD = Percent Difference

RRf(wtfm) = Rainfall Recharge for normal monsoon season rainfall estimated using Water Table Fluctuation Method

RRf(rifm) = Rainfall Recharge for normal monsoon season rainfall estimated using Rainfall Infiltration Factor Method

GROUND WATER RESOURCES ESTIMATION

PERCENT DIFFERENCE

The rainfall recharge for Normal Monsoon Season Rainfall is finally adopted as per the following criteria.

If -20% < PD < +20% **Final Rainfall Recharge = RRf(wtfm)**

If PD < -20% **Final Rainfall Recharge = RRf(rifm)* 0.8**

If PD > +20% **Final Rainfall Recharge = RRf(rifm)* 1.2**

GEC 2015

GROUND WATER RESOURCES ESTIMATION

Total Ground Water Recharge During Monsoon Season

$$TGWR_m = R_{Rf} + R_C + R_{SW} + R_{GW} + R_{T\,P} + R_{WCS} + R_{STR} \pm VF \pm LF - T\text{-}E\text{-}B$$

Where

$TGWR_m$ = Total Ground Water Recharge During Monsoon

R_{RF} = Recharge due to Rainfall

R_C = Recharge due to Canals

R_{SW} =Recharge due to Surface Water Irrigation

R_{GW}=Recharge due to Ground Water Irrigation

R_T=Recharge due to Tanks & Ponds

R_{WCS}=Recharge due to Water Conservation Structures

R_{STR} = Recharge due to hydraulically connected Streams

VF= Verical Flows from hydraulically connected aquifers

LF= Lateral Flows across boundaries

T = Transpiration

E= Evaporation

B= Baseflow

GROUND WATER RESOURCES ESTIMATION

Total Ground Water Recharge During Non-Monsoon Season

$$TGWR_n = R_{Rf} + R_C + R_{SW} + R_{GW} + R_{T\,P} + R_{WCS} + R_{STR} \pm VF \pm LF - T - E - B$$

Where

$TGWR_m$ = Total Ground Water Recharge During Monsoon

R_{RF} = Recharge due to Rainfall

R_C = Recharge due to Canals

R_{SW} =Recharge due to Surface Water Irrigation

R_{GW}=Recharge due to Ground Water Irrigation

R_T=Recharge due to Tanks & Ponds

R_{WCS}=Recharge due to Water Conservation Structures

R_{STR} = Recharge due to hydraulically connected Streams

VF= Verical Flows from hydraulically connected aquifers

LF= Lateral Flows across boundaries

T = Transpiration

E= Evaporation

B= Baseflow

GROUND WATER RESOURCES ESTIMATION

Total Annual Ground Water Recharge

The sum of recharge during Monsoon and Non-Monsoon seasons will be the Total Annual Ground Water Recharge.

GROUND WATER RESOURCES ESTIMATION

Annual Extractable Ground Water Resources

EGR = TAGWR – EFLOW

Where

EGR = Annual Extractable Ground Water Resources

TAGWR = Total Annual Ground Water Resources

EFLOW = Environmental Flows

(if not estimated 5% or 10% of Total Annual Ground Water Rsources)

GROUND WATER RESOURCES ESTIMATION

Stage Of Ground Water Extraction

$$Stage\ of\ \ Ground\ Water\ \ Extraction(\%) = \frac{\text{Existing gross ground water extraction for all uses}}{\text{Annual Extractable Ground water Resources}} \times 100$$

GROUND WATER RESOURCES ESTIMATION

Validation

SOGWE	Ground Water Level Trend	Remarks
≤ 70%	Significant decline in trend in both pre-monsoon and post-monsoon	Not acceptable and needs reassessment
> 100%	No significant decline in both pre-monsoon and post-monsoon long term trend	Not acceptable and needs reassessment

GROUND WATER RESOURCES ESTIMATION

Categorization of The Sub-Unit

Stage of Ground Water Extraction	Category
≤ 70%	Safe
>70 %and ≤ 90%	Semi-Critical
➢ 90%and ≤ 100%	Critical
➢ 100%	Over Exploited

GEC 2015

GROUND WATER RESOURCES ESTIMATION

Allocation Of Ground Water For Domestic Needs

$$A = 22 * N * L_g$$

Where

A = Allocation for domestic water Requirement in mm/year.

N = Projected Population density in the sub unit in thousands per square kilometer.

L_g = Fractional Load on ground water for domestic and industrial water supply (≤ 1.0)

365*60lpcd=21900l/year =22 m^3 /year

GROUND WATER RESOURCES ESTIMATION

Net Annual Ground Water Availability For Future Use

NAGWA = EGR – GEIRR- GEIND – AFDWR

Where

NAGWA = Net Annual Ground Water Availability For Future Use

EGR = Annual Extractable Ground Water Resource

GEIRR = Current Gross Extraction For Irrigation

GEIND = Current Gross Extraction for Industrial Needs.

AFDWR = Allocation For Future Domestic Water Requirement.

GROUND WATER RESOURCES ESTIMATION

GEC 2015

Additional Potential Recharges

1. Water logged and Shallow Water Table Areas.
2. Flood Prone Areas.
3. Spring Discharges

Potential Resource Due to spring Discharge

- Spring discharge constitutes an additional source of ground water in hilly areas which emerges at the places where ground water level cuts the surface topography.
- Spring discharge measurement is to be carried out by volumetric measurement of discharge of the springs.
- The committee recommends that in hilly areas with substantial potential of spring discharges, the discharge measurement should be made at least 4 times a year in parity with the existing water level monitoring schedule.

Potential Resource Due to spring Discharge

Potential ground water resource due to springs = Q x No of days

Where

Q= Spring Discharge

No of days= No of days spring yields.

GROUND WATER RESOURCES ESTIMATION

Static / Instorage Ground Water Resources

$$SGWR = A *(Z_2 - Z_1) * S_Y$$

Where

SGWR = Static Ground Water Resources

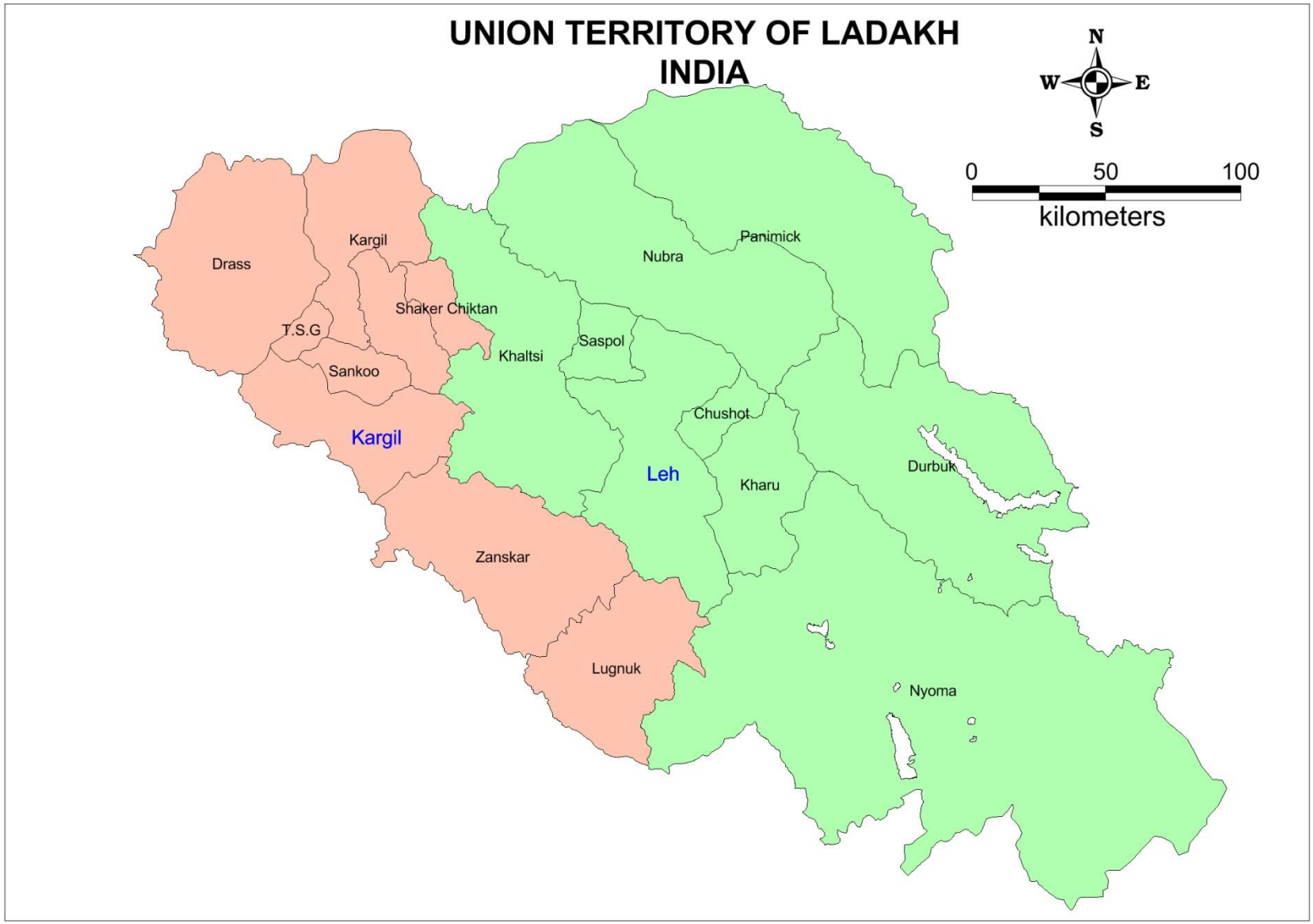
A = Area of the Assessment Unit

Z_2 = Bottom of Unconfined Aquifer

Z_1 = Maximum extension of Zone of Water Table Fluctuation

S_Y = Specific Yield in the Instorage Zone

Ground Water Resource Estmation of Ladakh as on March, 2017



GOVERNMENT OF JAMMU AND KASHMIR,
GENERAL ADMINISTRATION DEPARTMENT,
Civil Secretariat, Jammu.

Subject: Constitution of State Level Committee for Estimation of Ground Water Resources in Jammu & Kashmir State as on 31st March, 2017.

Reference: UO No.PW/Hyd/P&S/81/2017-18 dated 02.01.2018 from PHE, I&FC Department.

Government Order No. 236 -GAD of 2018
Dated: 09 .02.2018

Sanction is hereby accorded to the constitution of a State Level Committee, comprising the following, for estimation of Ground Water Resources in Jammu & Kashmir State as on 31st March, 2017:-

1	Administrative Secretary, Public Health Engineering, I&FC Department.	Chairman
2	Chief Engineer, Public Health Engineering Department, Jammu/Kashmir.	Member(s)
3	Chief Engineer, Irrigation & Flood Control Department, Jammu/Kashmir.	Member(s)
4	Director, Rural Sanitation, J&K.	Member
5	Director, Agriculture, Jammu/ Kashmir.	Member(s)
6	Director, Industries, Jammu/ Kashmir.	Member(s)
7	Regional Director, Central Ground Water Board, Jammu.	Member Secretary
8	Any other officer to be co-opted by the Chairman of the committee, if required.	Special Invitee

The terms of reference of the committee shall be to:

i. estimate annual replenishable ground water resources of the state in accordance with the Ground Water Resources Estimation Methodology; and

ii. estimate the status of utilization of the annual replenishable ground water resources.

The committee shall be serviced by the Public Health Engineering, I&FC Department.

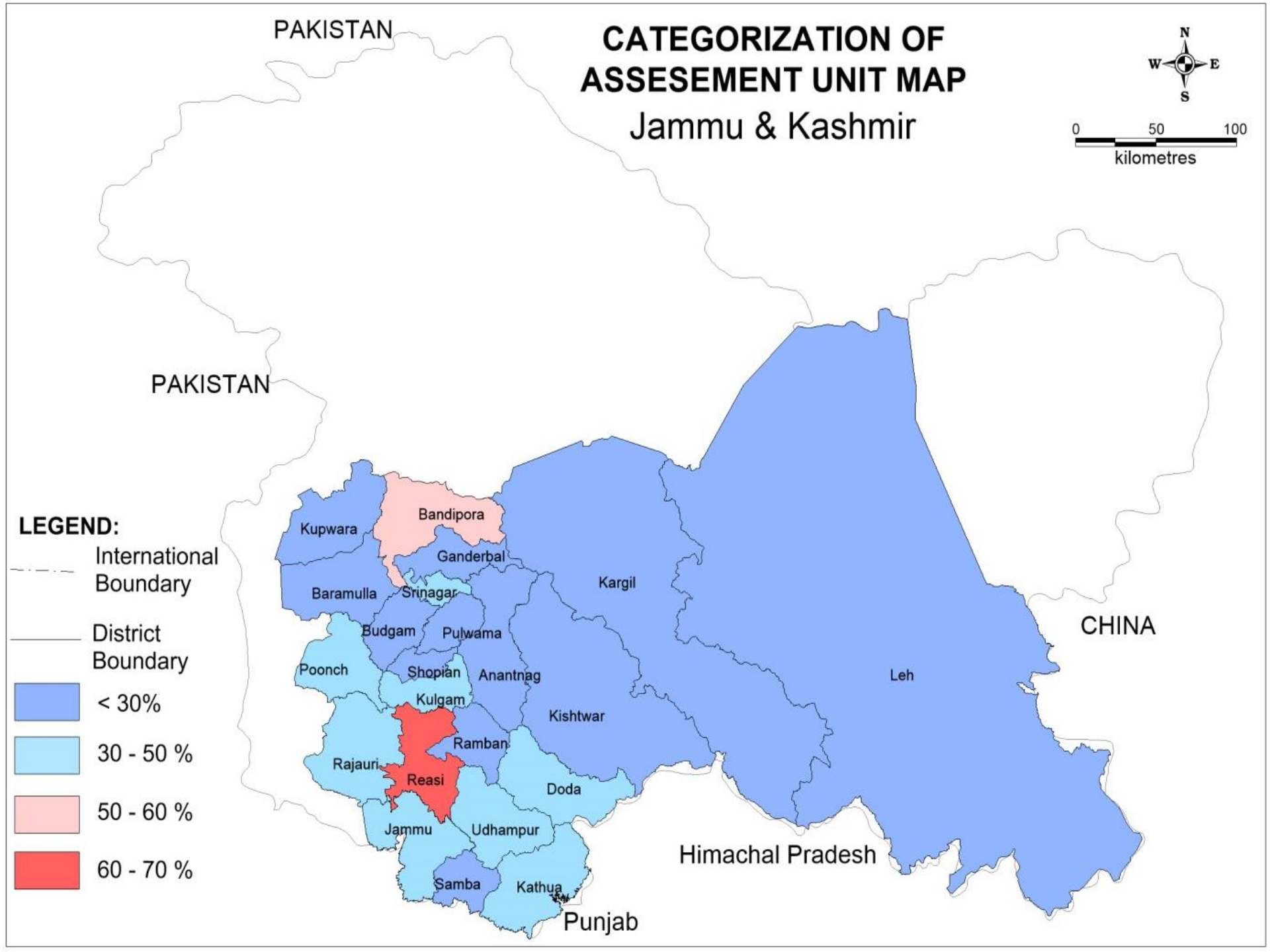
By order of the Government of Jammu and Kashmir.

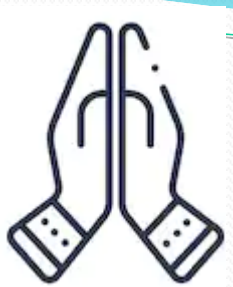
Sd/-
(Khurshid Ahmad) IAS,
Commissioner/Secretary to the Government.
Dated: 09 .02.2018.

No. GAD(Adm)09/2018-IV
Copy to the:-

SUMMARY of Ground Water Resource in Ladakh (All units are in Ham)

		LEH	KARGIL
1	Recharge from rainfall		
	monsoon	3305.79	109.44
	non-monsoon	6769.84	583.20
2	Recharge from other sources		
	monsoon	16.12	4.34
	non-monsoon	19.70	5.31
3	Annual ground water recharge	10111.46	702.29
4	Unaccounted annual natural discharge (5 %)	1011.15	70.23
5	Net ground water availability	9100.31	632.06
6	Current annual gross ground water draft (all uses)	1698	87
7	Current annual gross ground water draft (Irrigation)	90	24
8	Annual allocation of ground water for domestic and industrial water supply up to next 25 years	38.51	2.04
9	Net ground water availability for future irrigation use	8972	606
10	Was the rainfall recharge during monsoon season obtained using the water level fluctuation method	No	No
11	If the above response is 'yes" then how was the specific yield obtained (norms/pumping test//dry season/ water balance method)	NORMS	NORMS
12	**Stage of ground water development as a percentage**	**18.66**	**13.78**
13	Does the water level during the pre-monsoon interval show falling trend (yes / no)	NO	NO
14	Does the water level during the post-monsoon interval show falling trend (yes / no)	NO	NO
15	**Categorization for future ground water development (Safe / Semi-critical / Critical / Over-exploited)**	**SAFE**	**SAFE**


CATEGORIZATION OF
ASSESEMENT UNIT MAP
Jammu & Kashmir
N
W
E
S
0
50
100
kilometres
PAKISTAN
PAKISTAN
CHINA
Himachal Pradesh
Punjab
LEGEND:
International Boundary
District Boundary
< 30%
30 - 50 %
50 - 60 %
60 - 70 %
Kupwara
Bandipora
Ganderbal
Baramulla
Srinagar
Budgam
Pulwama
Poonch
Shopian
Anantnag
Kulgam
Kargil
Leh
Kishtwar
Ramban
Rajauri
Reasi
Doda
Jammu
Udhampur
Samba
Kathua



THANKS

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