

No. P.15011 / 24 / 2016 – SPR / 2037-2105
Ministry of Water Resources, RD & GR
State Projects Wing

Room No. 631, Shram Shakti Bhawan
Rafi Marg, New Delhi – 110 001

Date : July 2016

Office Memorandum

Sub. : Guidelines for Ground water Development and Recharge for Water Security and Irrigation Plan under Pradhan Mantri Krishi Sinchai Yojana (PMKSY) / Jal Kranti Abhiyan

Government of India has launched PMKSY, which envisages creation of additional irrigation potential in the country. Ground water plays significant role in meeting the demand for various usage of water, including that of irrigation and therefore, creation of new water sources through Ground Water Minor Irrigation has been made one of the sub-components of PMKSY under the component PMKSY (Har Khet ko Pani).

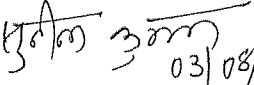
2. Ground water, a natural resource is controlled by several factors and any planning for ground water exploitation would essentially require proper understanding of the ground water system. The main irrigation security issues vis-a-vis Ground Water are in-sufficient sources / resources, poor source sustainability measures and over-exploitation of ground water necessitating the need to develop a system that sustains the sources of ground water with the active involvement of stakeholders (farmers). One of the key objectives of the PMKSY is Ground Water Development (GWD) by enhancing recharge of aquifers and introduce sustainable water utilisation practices.

3. One of the objectives of Jal Kranti Abhiyan is enhancing livelihood security through water security in rural areas. Among the various activities proposed to achieve the objectives of 'Jal-Kranti Abhiyan', the Jal-Gram Yojana envisages optimum and sustainable provision of water in two water stressed villages in each district in the country with the effective involvement of the stakeholders. Ground Water would play an important role in achieving water security at village level.

4. In view of above, need for a guideline for Ground Water exploitation in a sustainable manner was felt. To fulfil the need, "Guidelines for Ground water Development and Recharge for Water Security and Irrigation Plan under Jal Kranti

Abhiyan / Pradhan Mantri Krishi Sinchai Yojana (PMKSY)" has been framed with the approval of Competent Authority and is enclosed.

5. Hindi version of the Guideline was issued vide this office OM dated 07th June 2016


(Sunil Kumar)
Director (SPR)

Copy to :

1. PS to Hon'ble Minister (WR, RD & GR)
2. PPS to Secretary (WR, RD & GR)
3. PPS to Special Secretary (WR, RD & GR)
4. Chief Secretaries of all States as Chairman of SLSC of respective States
5. Chairman, CWC, Sewa Bhawan, New Delhi
6. Chairman, CGWB
7. Joint Secretary (A & GW), MoWR, RD & GR, New Delhi [It is requested to take further necessary action in view of enclosed guidelines in respect of GW component of PMKSY]
8. Joint Secretary (PP), MoWR, RD & GR, New Delhi
9. All Chief Engineers of CWC regional offices
10. Director (NIC), MoWR, RD & GR, for uploading on the website of Ministry
11. Under Secretary (GW), MoWR, RD & GR, New Delhi

Guidelines for Ground water Development and Recharge for Water Security and Irrigation Plan under Pradhan Mantri Krishi Sinchai Yojana (PMKSY) / Jal Kranti Abhiyan

1. Background

The focus of Pradhan Mantri Krishi Sinchai Yojana (PMKSY) is primarily to guarantee access to protective irrigation to all agricultural farms and to provide water security to foster much desired rural prosperity. 'Jal Kranti Abhiyan', which has been launched by Ministry of Water Resources, River Development and Ganga Rejuvenation (MoWR, RD&GR) aims at water conservation and water security so as to create better irrigation availability.

Ground water plays significant role in meeting the demand for various usage of water and is key input to achieve the goal of "per drop more crop" and water security at village level. However, an integrated approach for development of surface and ground water sources would be essential to ensure water and food security.

Ground water, a natural resource is controlled by several factors and hence any planning for ground water exploitation would essentially require proper understanding of the ground water system. The main irrigation security issues identified include in-sufficient sources / resources, poor source sustainability measures and over-exploitation of ground water and at times quality of water. Hence, there is a need to develop a system that sustains the sources of ground water with the active involvement of stakeholders (farmers).

Government of India has launched PMKSY, which envisages creation of additional irrigation potential in the country. One of the key objectives of the PMKSY is to enhance recharge of aquifers and introduce sustainable water utilisation practices.

Among the various activities proposed to achieve the objectives of 'Jal-Kranti Abhiyan', the Jal-Gram Yojana envisages optimum and sustainable provision of water in two water stressed villages in each district in the country with the effective involvement of the stakeholders.

Creation/increase of ground water irrigation potential may be proposed for the villages selected as Jal Grams under Jal Kranti Abhiyan and elsewhere in other rural areas of the country depending upon the availability and yield prospects of underlying aquifers. As two Jal Grams have been/ are to be selected / identified in all the 688 districts (Number of Jal Grams – 1376) based on the criteria of acute water crisis, the creation of additional irrigation potential in Jal Grams may be given priority. This can be achieved by either (i) construction of tube wells / bore wells; (ii) construction of artificial recharge structures or by a combination of both.

2. Creation of irrigation potential through Ground water

Creation of irrigation potential through ground water requires in depth understanding of yield potential of underlying aquifers. Hence, any new construction of water well should be based on the data / knowledge available for the area with the Central / State Agencies involved in ground water development and management. The important points to be considered before planning any ground water development are as below:

- i. Ground Water development (beyond the present level of extraction) for irrigation can be done in safe, semi critical Blocks/Talukas/Mandals. However, caution should be taken in semi critical blocks.
- ii. The volumetric limit for ground water extraction in a block may be restricted to 80% of Net Ground Water Availability with no significant long term declining trend in either pre- or post-monsoon. If the

- ground water extraction exceeds 80% in any assessment unit, further increase in drawl is not proposed.
- iii. In over-exploited and critical areas, no additional abstraction over and above the existing withdrawals be permitted without adequate augmentation measures at the level of unit of ground water assessment.
 - iv. In Critical and semi-critical areas, which are part of canal command, farmers should be encouraged to adopt conjunctive use of surface and groundwater.
 - v. In Critical and semi-critical areas which are part of rain fed area, farmers may be encouraged to undertake irrigation activities through combination of rain water harvesting and ground water extraction.
 - vi. In OE (Over Exploited), critical and semi critical areas, following practices to be followed depending upon the socio-economic condition in the areas.
 - i) Adoption of water use efficiency by installation of drip / sprinkler system on tube wells in farms.
 - ii) Practicing diversification to low water requiring crops
 - iii) On farm rain runoff harvesting in dug well
 - iv) Extending sowing of Rabi crops near monsoon period.
 - vii. Safe block in alluvial and semi consolidated areas where stage of ground water development is less than 50% shall be encouraged for ground water based irrigation with periodic assessment and evaluation so as not to exceed 80%.
 - viii. In safe block in hard rock terrain having stage of ground water development less than 50%, the extraction can go up to 80%, but any increase beyond present level of extraction should adopt efficient irrigation practices.

- ix. In water logged areas, where ground water level is within two meters of ground surface, on-farm ponds for fisheries can be encouraged as alternative livelihood for farmers.
- x. The State agencies involved in planning and execution of ground water schemes should consult State Ground Water Department for proper understanding of aquifer system in the area, spatio-temporal behavior of water level, ground water resource availability, artificial recharge structures suitable for that area and sites for their construction.
- xi. To minimize the failure of wells in hard rock areas, geophysical and hydro-geological investigations may be carried out for proper site selection.

2.1 Creation of Ground Water irrigation potential in critical and over exploited areas:

In critical and over-exploited blocks, additional irrigation potential may be created through various water management interventions including various supply and demand management measures. It is proposed to undertake ground water augmentation measures by way of constructing suitable rainwater harvesting/ artificial recharge structures, adopting efficient irrigation practices and promoting crop diversification to grow less water consuming crops which will enhance overall availability of water resources and increase sustainability of ground water sources. The ground water recharge measures would help in stabilizing / raising the ground water level which will result in to several intangible benefits in terms of reduction in lifting cost and energy consumption, increase in soil moisture etc and ground water linked ecology of the area. In the long run continued effort of augmentation of ground water resources will surely result in tangible benefits enabling to increase in ground water irrigation potential.

The number and type of recharge interventions / structures to be constructed will depend upon the local hydro-geomorphological condition of the area, rainfall pattern, geomorphic set up and shall be identified based on ground water conditions and other scientific studies and utilizing appropriate technology, including remote sensing studies. The following indicative structures/activities and their estimated costs are suggested for taking up in the integrated irrigation security plan depending upon the technical feasibility in the area:

S.No.	Item / Proposed Structures	Unit cost (Rs)
1	Check dam	200000
2.	Farm Ponds	100000
3	Percolation Tank(Hard rock areas)	250000
4	De-silting and renovation of tank	85000
5	Strengthening of embankments of ponds and plantation	50000
6	Renovation of dug wells (to be covered) and installation of hand pumps	50000
7	Shafts	100000

The above activities where ever proposed and possible, may be executed with convergence of MGNREGA.

2.2 Creation of Ground Water irrigation potential in safe and semi-critical areas:

In safe & semi-critical blocks/ talukas/ mandals / firkas, construction of new irrigation tube wells/bore wells is recommended for creation of ground water irrigation potential. The analysis of available data indicates that one Tube well (TW) / Bore Well (BW) of 80 to 100 m depth can irrigate about 2 to 5 hectares of agriculture land (average 3.5 hectares) depending on different hydrogeological environs and yield potential of underlying aquifer. Cost for construction of one TW/BW widely varies from State to State and depends on ground water conditions in the area. The indicative cost of

construction of tube wells / bore wells including carrying out electrical logging, Aquifer performance Test, protective casing / platform (excluding the cost of pump) is given below:

S.No.	Type and depth of Tubewell/Borewell	Indicative cost
A. Hard Rock Areas		
1	Upto 100m depth (7" diameter well)	Rs 3,00,000/-
2	Upto 200m depth (7" diameter well)	Rs 5,00,000/-
B. Alluvium Areas		
1	Upto 100m depth (10" diameter well) with MS Casing	Rs 8,50,000/-
2	Upto 200m depth (10" diameter well) with MS Casing	Rs 14,50,000/-

However, in the absence of any equivalent Central Scheme Norms, the Norms/condition prescribed by the respective State Governments will be considered subject to maximum of indicative cost for each type and depth of TW / BW mentioned in above table.

The irrigation potential per well may be further enhanced by proper designing of the wells , installing efficient pumps of required horse power and adopting efficient irrigation practices like micro-irrigation, reducing conveyance losses by placing impervious plastic sheets along the path of feeding channels for preventing return seepage etc. Further, as far as possible community tube wells may be preferred to reduce energy consumption and facilitate participatory approach involving stakeholders. The number of tube wells may be worked out based on the availability of ground water, hydraulic properties of aquifer, yield capacity and unit draft of wells. However, the volumetric limit for ground water extraction in a block may be restricted to 80% of Net Ground Water Availability. If the

ground water extraction exceeds 80% in any assessment unit, further increase in drawl may not be proposed to maintain ecological sustainability.

3 IMPLEMENTATION PLAN FOR GROUND WATER DEVELOPMENT

3.1 The State Govts. shall ensure that such projects/Schemes form part of DIP/SIP to be prepared under PMKSY.

3.2 The line department at District Level will prepare Preliminary Project Report (PPR) in their respective domain in consultation with Block Level Committee / Village Level committee. Template / format for data collection at Block/ village level and preparation for Preliminary Project Report are at **Annexure I & II** respectively.

3.3 A PPR for the feasibility of the different type of structures, its site selection and engineering design may be prepared by the Line Department / Implementing organization. The broad guidelines for different artificial recharge schemes prepared by Central Ground Water Board can be accessed on the following web-links

<http://www.cgwb.gov.in/documents/masterplan-2013.pdf>,

<http://www.cgwb.gov.in/documents/Manual-Artificial-Recharge.pdf>,

<http://www.wrmin.nic.in/writereaddata/ModelDesignsforRainWaterHarvesting.pdf>

3.4 Necessary approvals on the PPR (of individual or cluster of projects) will be obtained by the line department / implementing organization from the respective State Level Sanctioning Committee (SLSC) on recommendations of District Level Committee and sent to Ground Water Desk of MoWR, RD & GR by the nodal department of the State for PMKSY. SLSC would ensure that there is no duplicacy in approval of the projects.

Ground Water Desk, MoWR, RD & GR may get it evaluated from CGWB. The progress of implementation of the work will be periodically monitored by CGWB and Ground Water Desk of MoWR, RD & GR.

3.5 District Magistrate will make all efforts to create WUA for the same.

3.6 The asset created will be utilized through micro-irrigation and necessary infra structure will be created. The State Govt. shall incentivize the farmers for use of MIS and may seek funds from Ministry of Agriculture and Farmers' Welfare as per their Guidelines for PMKSY (per drop more crop).

3.7 Completion certificate shall be submitted by the line department/ implementing organization through the District Magistrate / District Collector and nodal department of the State for PMKSY to funding agencies at Central and State level.

3.8 The assets would be created on the Government land only.

3.9 The assets created through this programme shall be handed over to the Water User Associations / PRIs who will maintain the assets through their own resources.

3.10 As per Command Area Development and Water Management Programme, a lump sum functional grant @ Rs 1200 per hectare will be provided to Water User Associations, which will be shared between the Centre and the State in the ratio of 60:40 (C:S). The grant may be deposited in the bank account of Water User Associations under Term Deposits Scheme which can not be withdrawn but the interest earned on the deposit would be utilized for the upkeep of the asset created.

3.11 Training to the members of Water Users Association and local beneficiary farmers is necessary. The training is to be scheduled in five phases of one day each. The trainer's team should comprise of a local official of Groundwater Board, a local engineer and an official from agriculture background. For training, the farmers and members of Water Users Association of both the "Jal Grams" would assemble at any village. First phase of training will be conducted after completion of field channels / plastic pipes and micro-irrigation structures, second at the time of water distribution, third at the time of recording the individual irrigated area, fourth at the time of preparation of water charges for individual irrigated farm and fifth and final at the time of harvesting of crops. The subjects / topics of trainings are at **Annexure-III**.

3.12 PMKSY Guidelines would be applicable mutatis mutandis, in respect of composite funding for all PMKSY projects except for technical guidelines in relation to structures covered, design, cost norms etc.

4 FINANCIAL MECHANISM (FUND FLOW)

4.1 Essential requisitions for States

- The States need to make suitable provisions for executing the scheme in their Plan. They also need to ensure necessary budgetary provisions for the same.

4.2 Total cost as per Preliminary Project Report, subject to maximum of indicative cost for each type and depth of TW / BW mentioned in para 2.2 and for each type of structure mentioned in para 2.1 above, may be shared 60:40 (C : S) between Centre and States/UTs except for NE & Hilly States where the total cost will be shared 90:10 (C : S).

4.3 Release of Advance

- 1st Instalment amounting to 60% of the Govt. Of India's share of the total costs as per PPR to be released on request by the State Govt. to them.

- 2nd Instalment to be released after submission of utilization certificate in GFR-19A for 70% of the earlier release including matching state share
- The States should ensure to make budgetary provisions accordingly.

4.4 If expenditure is incurred by the State governments and reimbursement is sought, Central share of actual expenditure for the activities approved by the MoWR, RD & GR would be reimbursed in the same financial year as far as possible. If the central assistance is not released in that financial year, reimbursement would be in the next financial year. However, in no case, ex post facto approval of project and reimbursement of expenditure for the same will be made / done.

4.5 The progress will be monitored by Ground Water Desk as per PMKSY guidelines.

Format for Collection of Information by Block Level/ Village Level
Committee

Part I: Information on Village Details

1. State
2. District
3. Block/Taluka/Mandal/Firka
4. Gram / Village
Latitude
Longitude
5. Terrain (Hilly, Plains etc.)
6. Complete Postal Address
of the Gram Panchayat

(Sketch Map indicating location
be attached)
7. Average Annual Rainfall (mm)
8. Population (no.)

Total

Below Poverty Line
9. Livestock Population (no.)
10. Agriculture Land (ha.)
11. Principal Crops
12. Other Crops

Part III: Vulnerability Assessment

15. Details about shortfall in water availability

Purpose	Total Availability (including SW & GW)	Estimated shortfall (including SW & GW)
Domestic		
Irrigation		

16. Details about On-going Central/State Schemes

Repair, Renovation & Restoration (RRR) of Water Bodies

Integrated Watershed Management Programme (IWMP)

National Rural Drinking Water Programme (NRDWP)

National Rural Health Mission (NRHM) –reg water quality aspects

MNERGA

Any Other-give details

17. Suggestions for improving Water Availability for meeting Demand and achieving Water Security and any relevant schemes from above which can be leveraged for the same
- (a) Dug Well, DCB, Tubewell, Borewell
 (b) Tank Rejuvenation
 (c) Farm Pond, shaft, check dam etc
 (d) Surface Water
 (e) Any Other
18. Any special conditions existing in the village which are not usually envisaged elsewhere

- Separate sheets may be used where space provided is inadequate.

Annexure – II

Format for Preliminary Project Report on Ground Water Security and Irrigation Plan under Pradhan Mantri Krishi Sinchayee Yojana (PMSKY)

1. State :
2. Implementing Organization :
3. District :
4. Block/Mandal/Taluku/Firka :
5. Village :
(along with village information
as per Annexure-A)
6. **Baseline information** :
 - i) **Brief Background** :
(Geomorphology, Pedology, Land use:
Hydrometeorology of the area)
 - ii) **Ground water conditions** :
 - Geology & aquifer systems
 - Depth to water level—Pre-and Post-monsoon
 - Rate of decline/rise in water levels-Long term trend
 - Yield of dug wells, DCBs, TW/BW
 - Available Ground water resources in
Block as on 2011 (Ham)
 - Net availability of G W for irrigation(Ham)
 - % of GW development
 - Category of GW development
 - Quality of ground water
 - Ground Water related issues of the area
7. Surface water- Ground water availability, :
Demand-supply gap & brief on water security plan
8. **Details of wells to be constructed (if any)** :
(Safe & Semi-critical areas)
 - i) Type of well (DCB/TW/BW) :
 - ii) Depth of well(m)

- iii) Command area of each well
- iv) Number of wells to be constructed (location wise)
- v) Total irrigation potential to be created (Ha)
- vi) Unit cost of well (Rs)
- vii) Number of Man – days utilisation from MGNREGA and equivalent Rs.
- viii) Total / Net cost of wells to be constructed
- ix) Cost for creation of unit irrigated area (Rs/Ha)

9. **Details of Artificial Recharge structures** :

(Over exploited & Critical areas)

- i) Run off generated in village area
- ii) Type of structure(s) proposed
- iii) Location & Layout plan of structure of each recharge structure
- iv) Details of design of structure alongwith Maps (to be enclosed)
- v) Annual Recharge to Ground water from Artificial recharge structure(s) (Ham)
- vi) Cost for construction of each structure (Rs)
- vii) Number of Man – days utilisation from MGNREGA and equivalent Rs
- viii) Total / Net cost of all recharge structures (Rs)
- ix) Unit cost of recharge (Rs/Ham)

10. **Expected stage of GW development after Project completion**

11. **Total cost of the Project (Rs)** :

- i) Share of the Centre Govt. in Rs (60% of total cost)
- ii) Share of State Govt. in Rs (40%)
- iii) 1st installment (60%) to total cost
 - Centre share in Rs [60% of (i)]
 - State share in Rs [60% of (ii)]
- iv) 2nd installment (40%) to total cost
 - Centre share in Rs [40% of (i)]
 - State share in Rs [40% of (ii)]

12. **Likely output of the project (Tangible/Intangible)** :

Signature

(Chairman, Block Level Committee)

Recommended by Chairman District Level Committee

Annexure-III

Training of Water User Associations and farmers of selected village.

S.No.	Subject	Trainer
1	Introduction of water sources, methods of use and precautions.	Groundwater Specialist
2	Participatory irrigation management, WUAs - their duties and responsibilities.	Engineer
3	Selection of crops based on climate, soil and water availability; required quantity of good quality seeds and fertilizer.	Agricultural Scientist
4	Availability of Groundwater resources and the limit of its exploitation	Groundwater Specialist
5	Modern methods of irrigation and water saving	Engineer
6	Diseases in crops, protection and precautions; Irrigation at the Critical stage growth of crops.	Agricultural Scientist
7	Water management of crops, Proportionate water distribution to farmers (Warbandi), Irrigation water to crops not to fields.	Engineer
8	Water availability in aquifers, Water & energy efficiency in groundwater exploitation	Groundwater Specialist
9	Introducing farmers to schemes operated by Centre/States for their benefits	Agricultural Scientist
10	Drip and sprinkler irrigation method –usage and precautions. Writing details about each farmer's irrigated farm / area.	Engineer
11	Providing information to farmers and WUAs about maintenance of structures	Groundwater Specialist
12	Precautions and irrigation requirement for maturity of crops	Agricultural Scientist

13	As far as possible, conjunctive use of surface and groundwater otherwise, development of other water sources in the area of the village. Details of irrigation water charges and educate farmers about its collection.	Engineer
14	Management of Water Sources for next season, water conservation and artificial recharge	Groundwater Specialist
15	Arrangement of fertilisers and seeds for next crop / season and selection of crops	Agricultural Scientist

Important Points:

1. If a particular topic is necessary, it can be included too.
2. In the training programme, no one other than one chief guest, apart from speakers, shall deliberate.
3. Each speaker will conclude in 40 minutes.
4. Discussion with farmers shall be of 2 hours during which only subject experts would answer the questions.
5. The feedback of the proceeding with farmers must reach the nodal officer within 5 days.

