

Importance of Pradhan Mantri Krishi Sinchayee Yojana in Uttarakhand

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Abstract

Rain fed agriculture provides 58 per cent of the World's food basket while accounting for 80 per cent of agricultural lands. Water for food production is becoming increasingly scarce as a result of worldwide population growth, and the situation is further exacerbated by climate change. Rain fed areas are hotspots for poverty, malnutrition, and food insecurity, as well as regions prone to extreme land degradation, water scarcity, and inadequate social and institutional infrastructure. As a result, PMKSY is regarded as an effective tool for tackling many of these issues, as well as a potential engine for agricultural growth and development in vulnerable and marginal rain-fed areas. The Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) promotes water conservation in order to address the country's growing water shortage. Present paper aim is to discuss that importance of irrigation practice, Government scheme for irrigation, importance of PMKSY.

Keywords: Attitude; Beneficiaries; PMKSY.

INTRODUCTION

Agriculture is the primary source of income in the villages. India's economy is believed to be based primarily on agriculture, where more than half of the population rely on farming and related industries for living. The socio-economic development of farmers and the Nation as a whole is significantly influenced by agriculture. It has played

a crucial role in every stage of human civilization and in economy. Total 54.6 per cent of work force is engaged in agricultural and allied sector activities (*Census, 2011*). According to Economic Survey 2021-22 the share of the agriculture & allied sector in country's Gross Value Added (GVA) is 20.2 per cent in the year 2020-21 and 18.8 per cent in 2021-22.

The Indian agriculture sector has been growing at an average annual growth rate of 4.6 per cent during the last six years. It grew by 3.0 per cent in 2021-22 compared to 3.3 per cent in 2020-21. In recent years, India has also rapidly emerged as the net exporter of agricultural products. In 2020-21, exports of agriculture and allied products from India grew by 18 per cent over the previous year. During 2021-22, agricultural exports reached an all time high of US\$ 50.2 billion. Total food grains production increased from 259.3 million tonnes in 2011-12, to 308.6 million tonnes in 2020-21. Total production of Cereals increased from 242.2 million

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tonnes in 2011-12, to 282.9 million tonnes in 2020-21. Total production of Pulses increased from 17.1 million tonnes in 2011-12, to 25.7 million tonnes in 2020-21 (*Economic Survey 2021-22*).

Agriculture and allied sectors have been the least impacted by the pandemic. The sector is estimated to grow 3.9 per cent in 2021-22, after growing 3.6 per cent in 2020-21 and 4.3 per cent 2019-20. *National Statistical Office* (NSO) in its 77th round of survey, which was conducted during 1st January 2019 to 31st December 2019 says that the average monthly income per agricultural household, as per paid out expenses approach is 10218 Rupees. The average monthly income per agricultural household was 6426 Rupees as per the last Report in 2014. Thus, agriculture plays an important role in Indian economy.

Importance of irrigation sources in agriculture

The essential element necessary to sustain life on earth is water. It is a crucial component of agriculture in almost every aspect, with a determining impact on the final output. Increased population and the need for food security have led to a rise in the need for irrigation water, which could only be satisfied by wise use of the available water resources.

With 14 major, 44 medium, and 55 minor rivers making up around 83 percent of the catchment area, the Nation receives about 3 trillion m³ of precipitation annually. Water supply is expected to be available in the amount of 210 billion m³.³ The availability of irrigation water is dwindling. As a result, it is crucial to harvest water properly and use it effectively. Water availability per person in India has decreased due to the growing population, falling from 5178 m³ per year in 1951 to 1441 m³ in 2015, which is less than the water stressed standard of 1700 m³ /year. About 60 per cent of Indians have annual water availability levels that are near to or below the 1000 m³ criterion for water scarcity. India's population is expected to reach 1.64 billion in 2050, which will cause the per capita water availability to further decrease to 1139 m³ per year.

The Gross water demand for all users in India was 813 BCM in 2010 and is projected to reach 1447 BCM in 2050 (*Central Warehousing Corporation, 2021*).

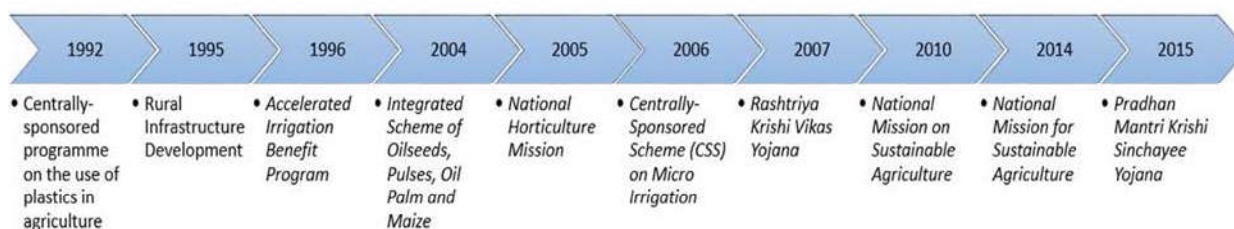
Water is a critical input for agriculture which accounts for about 80 per cent of the current water use in the country. The net irrigated area makes up about 49 per cent of the total net sown area in the Nation. About 40 per cent of the net irrigated area is irrigated through canal systems, and 60 per cent is irrigated through groundwater (*Ground water year book, 2019-20*). The proportion of agriculture in overall water usage is predicted to decrease from its current level of 85 per cent to 74 per cent in 2050 as a result of growing inter sectoral rivalry (*GoI, 2015*). These estimations unambiguously reveal that agriculture must produce more food with less water in order to feed a growing population with shifting dietary preferences. This suggests that in order to make agriculture sustainable over time, effective irrigation techniques must be adopted.

According to *Viswanathan and Bahinipati (2015)* the country has become more aware of micro-irrigation systems as a result of the water shortages in different regions, and its adoption has made a positive impact on both the economy and society. The benefits are noticed in terms of crop yields, reduction in energy consumption, reduction in the use of chemical fertilizers & pesticides. The Government is making all efforts to enhance water use efficiency at farm level through adoption of micro irrigation in all the States of the Country and till January 2022 an area of 137.80 lakh ha has been covered under Micro Irrigation (pib.gov.in).

Government Schemes related to micro irrigation

In 1981, the National Committee on Plasticulture in Agriculture (NCPA) authorised the use of plastics in agriculture on a trial basis, which marked the beginning of the micro irrigation (MI) movement in India. The NCPA placed a strong emphasis on encouraging the use of plastics for mulching, drip irrigation, and greenhouses in its four subsequent reports (1982, 1983, 1984, and 1985).

Evolution of micro-irrigation schemes in India



1. **Centrally sponsored programme on the use of plastics in agriculture:** It was introduced by the Indian Government in 1992 in response to the NCPA's suggestions. Depending on the size of the land, the cost, and the farmers' financial situation, farmers could receive financial support or a subsidy for installing MI systems under the scheme. Along with constructing drip irrigation, the Government also provided subsidies for drip demonstration farms.
2. **The Rural Infrastructure Development Fund (RIDF):** RIDF is governed by the National Bank for Agriculture and Rural Development (NABARD), was established by the Government in 1995–1996 with an initial budget of Rs. 2000 crore to speed up the adoption of MI technology. Through the RIDF, financial aid was given to a total of 36 eligible operations, including micro, major, and medium irrigation projects.
3. **The Accelerated Irrigation Benefit Program (AIBP):** AIBP was established in 1996–1997 to provide Governments with financial support in order to hasten the completion of ongoing irrigation projects. Financial support was prioritized for irrigation projects that needed to be extended, renovated, or modernized (ERM), with the requirement that MI be implemented in at least 10 per cent of the command area.
4. **Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize (ISOPOM):** ISOPOM was launched in 2004 and financial assistance same as AIBP was given for the creation of an effective irrigation infrastructure through the distribution of sprinkler sets or drip systems in 14 major oilseeds growing states. Participation in this programme was open to all types of farmers, including those in small and marginal categories.
5. **The National Horticulture Mission (NHM):** This programme was established in 2005, and this hastened the large scale deployment of MI operations while strengthening them. In order to advance MI technology, the project planned to create water supplies, protected cultivation, and precision farming. NHM was reconfigured in 2014–15 as a Mission for Integrated Development of Horticulture (MIDH), with broad objectives for the comprehensive expansion of the horticulture sector. Through controlled cultivation and the construction of water supplies, MI adoption is promoted in MIDH.
6. **Centrally Sponsored Scheme (CSS) on Micro Irrigation (MI):** The Government of India announced the Centrally Sponsored Scheme on MI on January 20, 2006 after realising the potential advantages of MI technology in sustaining crop productivity and preserving water resources. The scheme's major goal was to increase WUE in the agriculture sector by encouraging farmers to use appropriate technical interventions such as drip and sprinkler irrigation. Farmers who install drip or sprinkler irrigation systems in their fields received a 50% subsidy under the micro irrigation plan. The maximum subsidy provided to a single farmer should be for five hectares of land. At the time of introduction, MI covered a region of around 2.24 Mha.
7. **Rashtriya Krishi Vikas Yojana (2007):** This scheme was launched in 2007. MI was added as one of the components in the flagship programme, Rashtriya Krishi Vikas Yojana in order to guarantee an overall growth rate of 4 per cent of the agriculture and allied industry,
8. **National Mission on Sustainable Agriculture:** The Government upgraded the Centrally Sponsored Scheme on Micro Irrigation into the National Mission on Micro irrigation in June 2010 and then to the National Mission on Sustainable Agriculture in April 2014 in order to bring all states, including those in the north-eastern and Himalayan regions, under the purview of the MI scheme.
9. **National Mission for Sustainable Agriculture (NMSA):** NMSA was launched in 2014. The main thrust of the scheme was given to the adoption of technologies that will help in protecting resources during extended spells of droughts and during heavy floods and to promote new water management techniques that will help in effective and optimum utilisation of water resources.
10. **Pradhan Mantri Krishi Sinchayee Yojana:** The Government has combined all current irrigation initiatives into the Pradhan Mantri Krishi Sinchayee Yojana as of the financial year 2015–16. The primary goals

of PMKSY are to deliver water to every field (*har khet ko pani*), increase use of precision irrigation and water saving technologies, and improve on farm water use efficiency (*per drop more crop*). The programme also intends to increase aquifer recharge, implement sustainable water conservation methods, and increase private investment by reusing treated water for peri urban agriculture. For PMKSY, a budget of Rs. 50,000 crores were allocated over the course of five years (2015–16 to 2019–20). The plan offers a thorough and integrated perspective of the complete "water cycle," and accurate water budgeting is carried out for all sectors, including home, agricultural, and businesses. Currently, 11.4 Mha of land has been placed under MI, of which 53.1 per cent is covered by sprinkler systems (6.06 Mha), and 46.9 per cent by drip systems (5.35 Mha) (*MoA & FW, 2019*). (*ICAR, Policy paper 36, 2020*)

Pradhan Mantri Krishi Sinchayee Yojana

On July 1, 2015, the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) was started with the goal of achieving convergence of investments in the irrigation sector at the field level. The programme intends to offer complete solutions for the irrigation supply chain, including farm level applications, water sources, and distribution networks. By capturing rainwater at the micro level through "*Jal Sanchay*" and "*Jal Sinchan*," PMKSY not only focuses on developing water sources for assured irrigation, but also in developing protective irrigation. Micro irrigation is an essential component of the system to maximize farm water use efficiency. The PMKSY embraces project driven execution at the state level, allowing states to create their own irrigation development based on District Irrigation Plans and State Irrigation Plans. In a paper "*Irrigation growth in India Prospects, Initiatives and challenges*" by Department of Water Resources, River Development and Ganga Rejuvenation Government of India, it was brought to light that the accomplishment of PMKSY projects along with the short-term projects will help in developing the water requisite needs to fulfill the future demand.

Objectives of Pradhan Mantri Krishi Sinchayee Yojana: The broad objectives of PMKSY include: (a) Achieve convergence of investments in irrigation at the field level (preparation of district level and, if required, sub district level water use plans). (b) Enhance the physical access of water on the

farm and expand cultivable area under assured irrigation (*Har Khet Ko Pani*). (c) Integration of water source, distribution and its efficient use, to make best use of water through appropriate technologies and practices. (d) Improve on-farm water use efficiency to reduce wastage and increase availability both in duration and extent. (e) Enhance the adoption of precision irrigation and other water saving technologies (More crop per drop). (f) Enhance recharge of aquifers and introduce sustainable water conservation practices. (g) Ensure the integrated development of rainfed areas using the watershed approach towards soil and water conservation, regeneration of ground water, arresting runoff, providing livelihood options and other NRM activities. (h) Promote extension activities relating to water harvesting, water management and crop alignment for farmers and grass root level field functionaries. (i) Explore the feasibility of reusing treated municipal waste water for peri-urban agriculture. (j) Attract greater private investments in irrigation. This will in turn increase agricultural production and productivity and enhance farm income.

Components of the PMKSY: 1. Accelerated Irrigation Benefit Programme (AIBP) to focus on faster completion of ongoing Major and Medium Irrigation projects being implemented by Department of Water Resources, River Development & Ganga Rejuvenation (MoWR, RD & GR). 2. PMKSY (*Har Khet Ko Pani*) to focus on source augmentation, distribution, ground water development, lift irrigation, diversion of water from water plenty to water scarce areas, supplementing rain water harvesting beyond IWMP & MGNREGA, repair, restoration, renovation of traditional water bodies etc. being implemented by Department of Water Resources, River Development & Ganga Rejuvenation (MoWR, RD & GR). 3. PMKSY (Per Drop More Crop) to focus on micro level storage structures, efficient water conveyance & application, precision irrigation systems, topping up of input cost beyond MGNREGA permissible limits, secondary storage, water lifting devices, extension activities, coordination & management being implemented by Department of Agriculture, Cooperation and Farmers Welfare (*DAC & FW*). 4. PMKSY (Watershed Development): to focus on ridge area treatment, drainage line treatment, soil and moisture conservation, water harvesting structure, livelihood support activities and other watershed works being implemented by Department of Land Resources.

Eligibility criteria: Instead of incremental

budgeting, PMKSY is a dynamic annual fund allocation methodology that mandates State to allocate more funds to irrigation sectors for becoming eligible to access PMKSY funds. For this purpose: (a) A state becomes eligible to access PMKSY funds only if it has prepared the District Irrigation Plan (DIP) and State Irrigation Plan (SIP), expecting for the initial year, and the expenditure in water resources development for agriculture sector in the year under consideration is not less than baseline expenditure. The baseline expenditure will be the average of expenditure in irrigation sector irrespective of state department (i.e. creation of rain water sources, distribution, management and application from state plan schemes) in state plan in three years prior to the year under consideration. (b) State will be given additional weightage for levying charges on water and electricity for irrigation purpose, so as to ensure sustainability of the programme. (c) Inter State allocation of PMKSY fund is decided based on (i) Share of percentage off unirrigated area in the state vis-à-vis National average including prominence of areas classified under Dessert Development Programme (DDP) and Drought Prone Area Development Programme (DPAP) and (ii) Increase in percentage share of expenditure on water resources development for agriculture sector in state plan expenditure in the previous year over three years prior to it. (iii) Improvement in irrigation efficiency in the state. (pmksy.gov.in)

IMPORTANCE OF PMKSY

PMKSY provides an opportunity for the linkage of District and State irrigation plans to work together (**Agriculture Times, 2020**). According to **Research Report IDC-7 (2016)**, PMKSY will help India address the issue of increasing food production, with the limited land and water resources available, by adopting integrated water resource management framework. PMKSY would help in drought proofing rainfed agriculture and at the same time enhance sustainability of irrigated agriculture by minimizing land degradation due to salinization, waterlogging, and imbalanced use of chemical fertilizers. It also addresses issues of equity of water access on one hand, while dealing with food and nutritional security for the growing population on the other. By building partnerships through PMKSY with different partners including farmers, extent agents, implementing agencies, private companies and government functionaries of different line departments, small holder farmers

would derive tangible economic benefits with increased production and value through the value-chain approach in the mission mode. In addition to the above benefits, the additional economic returns of 23 lakh crore will be added to the GDP in 10 years, triggering agriculture related industrial growth and revenue generation in addition to employment generation for several millions of youths in the country. But there are many obstacles in order to get full success from the scheme. **Adhikari et al. (2022)** in a study entitled "Constraints Faced by Beneficiary Farmers of Pradhan Mantri Krishi Sinchayee Yojana-Per Drop More Crop (PMKSY-PDMC) in Uttarakhand" revealed that the predominant infrastructural constraint faced by beneficiary farmers were lower quality of materials and equipment supplied by the company.

In a study on "Constraints Faced by the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) Beneficiaries in Adoption of Drip Irrigation System in Tamil Nadu" by **Rajguru et al. (2023)** it was revealed that the important constraints faced by the PMKSY beneficiaries in drip irrigation technology were, 'not suitable for field crops', 'clogging of drippers by suspended materials', 'insufficient supply of electricity for irrigation field', 'poor after sales service of the companies', 'High cost of maintenance', 'high cost of equipment/spare parts' and 'Inadequate awareness about the advantage of drip irrigation technology', Further it can be concluded that among all the constraints, financial constraints were the most important constraints in adoption of drip irrigation technology by PMKSY beneficiaries.

Despite these constraints faced the benefits and importance of micro irrigation particularly drip and sprinkle irrigation cannot be ignored. Additional advantages of efficient water use include an increase in the area covered by irrigation using the same amount of water and an increase in the potential use of marginal or degraded land using micro irrigation systems. Micro Irrigation helps in attaining greater water-use efficiency, thereby reducing the pressure on groundwater sources with reduced GHG emissions (**Suresh & Samuel, 2020**).

According to a study by the **Indian Council of Food and Agriculture (ICFA)**, after the adoption of micro irrigation systems in various states, farmers' incomes increased by a range of 24.5 per cent to 70.5 per cent, with an average rise of about 46.8 per cent. Adoption of drip irrigation technology has increased the net sown area, net irrigated area and thereby has helped in achieving higher cropping

intensity and irrigation intensity (**Kumara & Palanisami, 2010**). The increase in farmers' income following the adoption of micro irrigation systems should be emphasized and shared, particularly with other farmers, to ensure that these benefits are available to them as well.

CURRENT STATUS OF PMKSY

Total number of beneficiaries of PMKSY in India

S. No.	Component of PMKSY	Achievement during 2016-22
1.	Accelerated Irrigation Benefit Programme	New irrigation potential of 24.35 lakh hectare
2.	Command Area Development & Water Management	Covering of cultivable command area of 16.42 lakh hectare
3.	Har Khet Ko Pani- Surface Minor Irrigation	Irrigation potential of 2.58 lakh hectare created
4.	Har Khet Ko Pani (HKKP): Repair, Renovation and Restoration of water bodies	Irrigation potential of 0.84 lakh hectare created
5.	Har Khet Ko Pani: Ground Water	Command of 69,378 hectare irrigated by ground water.
6.	Per Drop More Crop (PDMC)	61.72 lakh hectare has been covered under micro irrigation
7.	Watershed Development	14.54 lakh hectare of additional area have been brought under protective irrigation
8.	PMKSY: PDMC	32,69,687 projects are under implementation (since June, 2018)
9.	PMKSY: Watershed Development Programme	5243 Projects completed (since June, 2018)

During 2016-17, ninety nine (99) on going Major/ Medium Irrigation projects have been included for financial assistance under Pradhan Mantri Krishi Sinchayee Yojana - Accelerated Irrigation Benefits Programme (PMKSY-AIBP), along with pari-passu implementation of Command Area Development & Water Management (CADWM). Out of these, 31 projects were completed till 2017-18 and 15 projects have been completed since June, 2018.

Under Surface Minor Irrigation (SMI) sub-component of PMKSY-HKKP, a total of 1,321 schemes have been included since 2018-19. Out of these schemes, 77 schemes have been reported to be completed since 2018-19. Under Repair, Renovation and Restoration (RRR) sub-component of PMKSY-HKKP, a total of 395 water bodies have been taken up since 2018-19. Out of these water bodies, RRR of 100 water bodies have been reported to be completed since 2018-19. Since 2019, 15 projects have been approved under Ground Water (GW) sub-component of PMKSY-HKKP in 12 States namely Assam, Arunachal Pradesh, Gujarat, Nagaland, Manipur, Mizoram, Tripura, Telangana, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal. Out of these approved projects, 13 are under various stages of implementation.

Under PMKSY - Per Drop More Crop, an area of 32.697 lakh hectare (ha) has been covered under

was not readily available in the public domain. However, according to a Government report from March 2021, around 1.78 lakh (178,000) water conservation structures were constructed under the PMKSY scheme, which benefited around 89,000 villages. Additionally, the scheme had allocated a total of Rs 83,000 crore (\$11 billion USD) for its implementation over a period of five years, starting from 2015-16.

Micro Irrigation in the country through PMKSY-PDMC from 2018-19 to 2020-21. Department of Land Resources has taken up 6,382 projects under PMKSY-WDC (Watershed Development component). Out of these projects, 5,243 have been reported to be completed.

Despite all the good components of scheme attitude of farmers are not very much favorable. **Devilal (2021)** in a study entitled "Knowledge and attitude of beneficiaries towards PMKSY" concluded that majority (66.66%) of the beneficiaries had moderately favorable attitude, 20.00 per cent of the beneficiaries had less favorable attitude and only 13.34 per cent of the beneficiaries had highly favorable attitude level towards PMKSY. In a study by **Kulkarni (2021)** on Attitude of beneficiaries towards Pradhan Mantri Krishi Sinchayee Yojana it is revealed that majority (65.84%) of the beneficiary farmers had moderately favourable attitude followed by 19.16 per centless favourable attitude and only 15.00 per cent of beneficiary farmers had highly favourable attitude towards Pradhan Mantri Krishi Sinchayee Yojana.

CONCLUSION

Success or failure of any programme depends on its pre-disposition of people in which they are

involved and attitude of people is a pre-condition for acceptance or rejection of an idea. "Attitude is relatively stable and cannot change easily". It is therefore, important to find out the attitude of farmers towards PMKSY. The scheme effortlessly attempts to converge irrigation outlay at the field level in order to improve ingress of water on the farm, improve efficiency of on-farm water to minimize wastage and increase availability, intensify aquifer recharge, implement precision irrigation and other water efficient technologies, increase cultivable area under irrigation, implement sustainable water conservation methods, and secure integrated management of rain fed areas by applying water management techniques. However, the success of these programmes has been not up to mark. Despite the Government's much needed push, there are major inter-component differences and attitude of beneficiaries is also not that much favorable. There is a need to look into this component of the scheme.

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