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ROLE OF AGRICULTURE EXTENSION IN THE ADOPTION OF MICRO IRRIGATION IN INDIA

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Abstract

India is running with water scarcity by holding 4 % world's water for 18 % of world's population. Water demand in agriculture sector in increasing because of increasing food demand and this sector has a pressure to produce more from less area. Irrigation is the major operation in agriculture which uses, rather wastes, a lot of water, therefore, the judicial use of water for irrigation is becoming very necessary now a day. Micro irrigation is the scientific method of irrigation which not only ensures the judicial use of water but also gives good yield and quality of produce to the farmers. Addressing the high initial cost of the system, National Bank for Rural and Agricultural Development (NABARD) was financing the system since 1985. In 2006, government launched a Centrally Sponsored Scheme for Micro Irrigation and given the subsidy to this technology. Nearly 2 million hectare area had been brought under micro irrigation through this scheme. National Mission on Micro Irrigation was launched in 2010 and it ensured the capacity building of farmers through training and extension. This resulted in the good coverage of area under micro irrigation and 7.73 million hectare area has been brought under micro irrigation till 2015. Presently the expansion of micro irrigation is going on under Pradhan Mantri Krishi Sinchai Yojana (PMKSY). One major guidelines of PMKSY is that the company will provide free services to the beneficiary for a period of at least three years from the date of installation of the system. The company Signet Industries Ltd. is also working under this guideline and providing the effective agriculture extension services, in addition to supplying quality irrigation system to the farmers.

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Introduction

India has 4 % world's water resource which is available to the 18 % of the world's population present in the country. India has 1123 billion cubic meter (BCM) of fresh water available for use every year. Being an agrarian country, major amount of water, 85 %, is used by agriculture followed by industry which uses 10 % and then the domestic purpose uses 5 % of the fresh water (Gulati, 2023). With the increasing population of the country water demand for all sectors are increasing. Water demand in agriculture is increasing because of increasing food demand also as this sector has the pressure to produce more from less area. Irrigation is the major operation in agriculture which uses, rather wastes,

a lot of water, therefore, the judicial use of water for irrigation is becoming very necessary now a days.

Micro irrigation is the scientific method of irrigation which ensures the judicial use of water, hence known as water saving technology. It comprises drip irrigation, sprinkler irrigation, mini sprinkler irrigation, and rain pipe irrigation. Drip irrigation is the modern method of irrigation which applies water drop by drop directly to the root zone of the plant in low volume and at frequent interval through a pressurized pipe network. It minimizes water wastage by providing precise amount of water to the root zone, reducing evaporation, deep percolation and weed growth. Drip irrigation ensures consistent moisture level in root zone at near field capacity level throughout the life cycle of the plant promoting healthier and fast plant growth. It results good yield to the farmers and higher production for the increasing population and thus helpful in meeting the increasing food demand. It also fetches the higher return to the farmers and increases their income.

Adoption of Micro Irrigation in India

The modern drip irrigation technology was introduced in India in mid 1980s. National Committee on use of Plastics in Agriculture (NCPA) was formed in 1981 under the Department of Chemicals and Petrochemicals to promote the use of plastics in agriculture and in irrigation. In 1983, NCPA started to work under Department of Agriculture and Cooperation. Initially the adoption of drip irrigation was slow in India but later on NCPA was reconstituted in 1996 to boost its adoption considering its importance in horticulture. It is named as NCPAH, i.e. National Committee on Plastics Application in Horticulture in 2001. Again in 2016, it is reconstituted as National Committee on Precision Agriculture and Horticulture. One of the major roles of NCPAH is to facilitate increased adoption of various plasticulture applications like drip and sprinkler irrigation systems, plastic mulch and protected cultivation in India.

Constraints in Adoption of Micro Irrigation

Micro irrigation techniques are beneficial in all respect as it not only save the water, which is precious input in agriculture, but also increase the yield and the quality of the produce. It also eases the farming operations for the farmers. In spite of having such the benefits, its adoption is slow among farmers due to the several reasons (Pandya and Dwivedi, 2016).

- High initial investment required to install drip irrigation system on the field.
- More maintenance required as compared to conventional irrigation.
- Damage to the system due to rats and other animals.
- Problems in farming operation due to lack of knowledge.
- Problem of clogging of drippers due to salt or impurity in water.
- Irrigation is to be done more frequently.
- Lack of technical knowledge and information about operation of drip irrigation for different crops.
- Unsatisfied after sale services.
- Laying and removing the drip irrigation system is problematic or difficult.
- Less availability of spare parts at local level.
- Difficult to understand and to maintain head and pressure.
- Negative feedback of careless farmers about drip irrigation.
- Non availability of skilled person for repairing the system.

- Difficulties about timely availability of electricity.
- Unawareness of drip irrigation technology if sufficient water is available.
- Use to practice as habit of farmers towards conventional irrigation method.

The task force on micro irrigation identified the constraints involved in adoption of micro irrigation and reasons for its low adoption in his report in January 2004.

- High initial cost.
- Lack of credit facilities.
- Technology intensiveness.
- Lack of training and information.
- Micro irrigation viewed more different than farm irrigation.

Extension Helps in Adoption of Micro Irrigation

Agriculture extension plays an important role in the adoption of drip and sprinkler irrigation in India by providing awareness and training on efficient irrigation technique at several levels. In addition to the extension services, government subsidy is the major support to address the issue of high initial cost in the adoption of drip irrigation system in India. National Bank for Agriculture and Rural Development (NABARD) has been financing micro irrigation system since 1985. Maharashtra was the first state to introduce subsidy on drip irrigation in 1986-87 (Bhamoriya and Mathew, 2014). Since ever, subsidy has become a regular government support in the spread of drip irrigation. Realizing the importance of micro irrigation, first time central government specially mentioned it in 8th five year plan in 1992. The Government of India has constituted a task force in June 2003 headed by N. Chandrababu Naidu, the then Chief Minister of Andhra Pradesh to look into the issues of micro irrigation in India and to suggest the strategies to expand micro irrigation, advise on technological support for crops, region specific interventions and to suggest measures to reach the benefits for the target groups. The task force submitted the report on January 2004. It estimated the micro irrigation potential in the country as 69.5 million hectare with 27 million hectare under drip irrigation and 42.5 million hectare under sprinkler irrigation. The team has recommended Rs. 10500 crore programme to cover about 3 million hectare under hi-tech irrigation system during the 10th plan (Narayanamoorthy, 2009).

However, the first real thrust came in 2006 when the government launched a Centrally Sponsored Scheme for Micro Irrigation with the objective to enhance water use efficiency in the agriculture sector by promoting appropriate technological interventions like drip and sprinkler irrigation techniques and to encourage the farmers to use it (Kumar and Eswaran, 2018). Nearly 2 million hectare area had been brought under micro irrigation by this scheme which is extremely miniscule when compare with the potential of 69.5 million hectare. Government of India has, therefore, decided to impart further thrust to this scheme by implementing it in a mission mode and upscaled the Centrally Sponsored Scheme to National Mission on Micro Irrigation (NMMI) in 2010, during 11th plan. NMMI addressed the three issues, i.e. area coverage under micro irrigation, transfer of technology through demonstrations, and human resource development through training, awareness programmes, exhibitions, publications and quality control. State Micro Irrigation Committees and District Micro Irrigation Committees were constituted under this mission. The mission ensured the good supply of good quality micro irrigation system to the farmers through BIS mark enforcement. Capacities building of farmers have been taken up through training and demonstrations with the active participation of state agricultural universities (SAUs),

precision farming development centers (PDFCs) and the industries (DAC, 2010). NCPAH has been involved in monitoring and reviewing the progress of the scheme. NMMI had also formed the technical support group which helped in monitoring the scheme including the technical guidance on irrigation system and on crop specific matters. NCPAH had strengthened the technical support group by developing the experts in various fields of agriculture, horticulture, water management, information technology, and human resources. By working under mission mode, 2.79 million more area had been covered under micro irrigation in India till 2014-15 (Global AgriSystem, 2014).

Presently, extensive extension work is going on to expand the area under micro irrigation in India under the currently running scheme Pradhan Mantri Krishi Sinchai Yojana (PMKSY) with the motto *har khet ko paani*. During 2014-15, the NMMI was subsumed as On Farm Water Management component of National Mission for Sustainable Agriculture (NMSA) and further subsumed Per Drop More Crop component of PMKSY. Pradhan Mantri Krishi Sinchai Yojana (PMKSY) was launched on 1st July 2015 with the objective achieve convergence of investments in irrigation sector at field level (DA & FW, 2021). The scheme aims at proving end to end solutions in irrigation supply chain from water resource to farm level application through distribution network and improving water use efficiency. Some key features of the scheme are emphasizing the importance of agriculture extension in the success of scheme. The operation guideline of PMKSY also provide the detail methodology of its implementation, assistance and monitoring. Some features of PMKSY are given below:

- District irrigation plan is the cornerstone for planning and implementing the scheme which identifies the gaps in irrigation chain after taking into consideration the currently available resources that would be added from ongoing schemes.
- The Annual Action plan is to be drawn from District Irrigation Plans.
- State irrigation plan focuses on cluster based approach and integrated development of different components in the irrigation chain.
- The scheme is to be implemented through the mechanism of Direct Benefit Transfer (DBT).
- The scheme will be monitored through web-portal of PDMC. Physical and Financial progress achieved during the preceding month is required to be up- loaded by states on the web-portal of PDMC.
- More focus be given on promotion of micro irrigation in rainfed areas and also for water intensive/guzzling crops to minimize water requirement.
- The pattern of assistance payable to the beneficiary under the micro irrigation scheme will be 55% for small and marginal farmers and 45% for other farmers which will be met by both Central Government and State Government in the ratio of 60:40 for all states except the North Eastern and Himalayan States.
- Only BIS marked systems/components can be supplied under the scheme.
- The registration of manufacturers/companies under the scheme will be for a period of 5 years.
- The company will provide free service after sales to the beneficiary for a period of at least three years from the date of installation of the system.

The company Signet Industries Ltd. is also working under guideline of Pradhan Mantri Krishi Sinchai Yojana (PMKSY) and providing the effective agriculture extension services to the farmers, in addition to supplying quality irrigation system to the farmers' filed. The extension services are becoming the key in expanding the adopting of micro irrigation by the farmers in India.

Status of Micro Irrigation in India

Only 3.09 million hectare area was under micro irrigation in India till 2005 after the introduction of this technology in the country. It was due to subsidy given by state government and NABARD. Centrally Sponsored Scheme for Micro Irrigation, which was launched in 2006, could add 1.85 million hectare more area under micro irrigation in the country. The adopting of micro irrigation was slow at farmers' level till 2010 because the schemes were focusing only on giving the subsidy to the farmers on micro irrigation. National Mission on Micro Irrigation launched in 2010 was the scheme which focused on agriculture extension and thus adopting also increased. NMMI added 2.79 million hectare more area under micro irrigation. An area of 8.35 million hectare has been covered under micro irrigation (PIB, 2024) in the country till March 2024 in last 10 years, i.e. after the extensive extension services under Pradhan Mantri Krishi Sinchai Yojana (PMKSY).

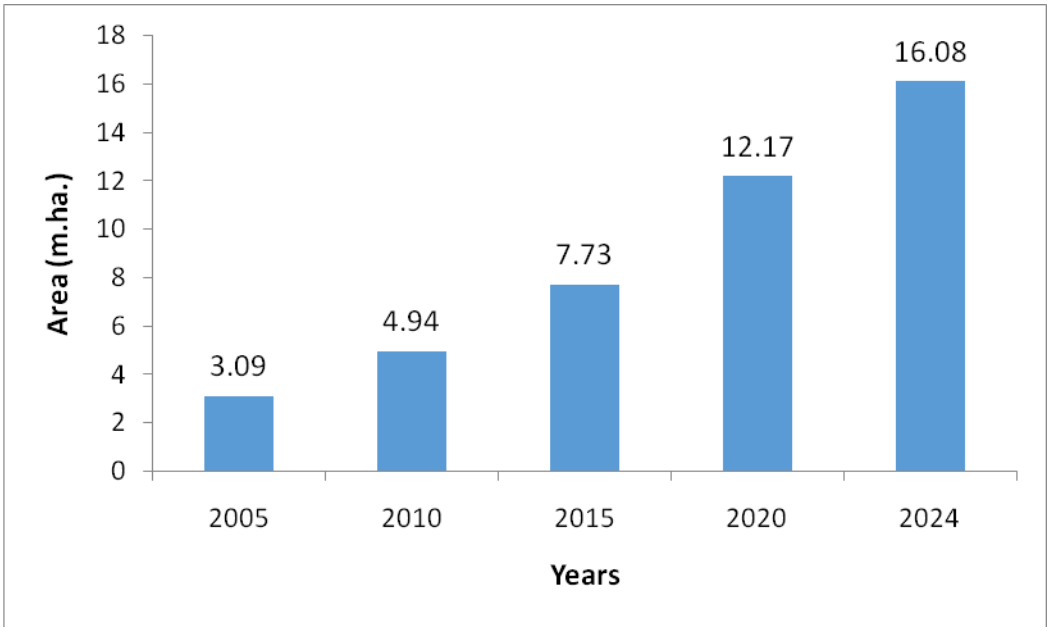

Fig 1: Year Wise Total Area Covered under Micro Irrigation In India

Conclusion

India has 69.5 million hectare potential area that can be brought into micro irrigation, but only 16.08 million hectare area has been covered under it so far. Though the progress is good in last decay but more work is required to increase the expansion of micro irrigation at farmers' field. As population and food demand are increasing fast, agriculture will have to produce more from less. Micro irrigation is the technology that not only save water but also ensures the better plant growth, high productivity and good quality of produce. But this can be achieved if farmers use the drip irrigation technology in correct manner. It is observed that farmers are not aware about system pressure, fertigation, and maintenance of irrigation system. More farmers' trainings are required so that farmers can not only adopt the micro irrigation system but also get its full advantages, maintain the system and take its services for long time, get good productivity and higher income for their family and ultimately, ensure the food security for the country.

References

Bhamoriya, V. and Mathew, S. 2014. An Analysis of Resource Conservation Technology : A Case of Micro Irrigation System (Drip Irrigation), *Final Report*, Centre for Management in Agriculture, IMM, Ahmedabad.

DAC. 2010. National Mission on Micro Irrigation : Operational Guidelines, Dept. of Ag. and Coop., Ministry of Ag., GoI. http://www.ncpahindia.com/nmmi/Guidelines-NMMI.pdf.

DA & FW. 2021. Operational Guidelines of Per Drop More Crop Component of Pradhan Mantri Krishi Sinchai Yojana, Dept. of Ag. and Farmers Welfare, Ministry of Ag., GoI. https://pmksy.gov.in/microirrigation/Archive/Revised%20PDMC%202021.pdf.

Global AgriSystem. 2014. National Mission on Micro Irrigation : Impact Evaluation Study, by Global AgriSystem, http://pmksy.gov.in/Archive/IES-June2014.pdf.

Gulati, A. 2023. Water is food : Indian agriculture must be geared towards efficient use of water, *Financial Express*, Oct.16, 2023.

Kumar, N. and Eswaran, S. 2018. Micro irrigation system in agricultural context – An overview, *National Congress on Micro Irrigation*, Water Technology Centre, TNAU, Coimbatore.

Narayanmoorthy, A. 2009. Drip and Sprinkler Irrigation in India : Benefits, Potential and Future Directions, International Water Management Institute, IWMI Books, Reports H042043.

Pandya, P. A. and Dwivedi, D. K. 2016. Constraints in Adoption of Drip Irrigation, *Advances in Life Sci.* 5(6) : 2405-2411.

PIB. 2024. Micro Irrigation. Press Information Bureau, New Delhi, Feb.06, 2024.