



भारतीय कृषि एवं खाद्य परिषद्
INDIAN COUNCIL OF FOOD AND AGRICULTURE

MICRO IRRIGATION NATIONAL ROUND TABLE CONFERENCE



10th JANUARY 2017
INDIA HABITAT CENTRE, NEW DELHI



MICRO IRRIGATION OVERVIEW



INTRODUCTION

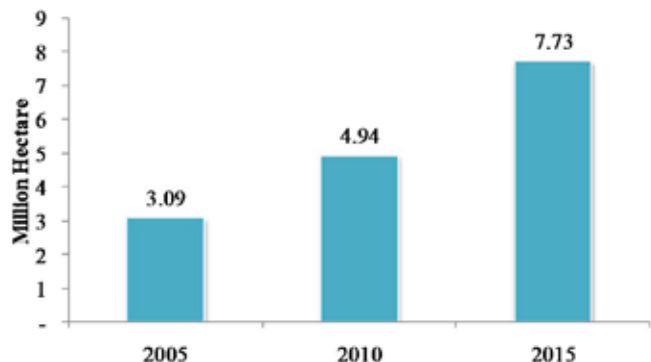
India has 18% of the world's population with only 4% of the usable water resources. According to a research report (2016), the total direct water withdrawal is nearly 3052 billion cubic meter (BCM) and 96 per cent of this is used in agriculture sectors with the contribution of rain water being about 1145 BCM. In 2014-15, food production declined to 251.1 mt from 265.04 mt the previous year. The reason behind the decline was the 12% monsoon rainfall deficit which clearly emphasizes the importance of water (irrigation) for agriculture.

Bridging the gap between rising demand for food with shrinking resource base is a vital challenge. Micro irrigation is the key to this looming water scarcity. With usage of micro irrigation systems, conveyance loss can be minimized as well as evaporation, runoff and deep percolation can be reduced. Added advantage is that water sources with limited flow rates such as small water wells can be used for micro irrigation. Due to proximity and focused application, it provides significantly higher water usage efficiency and maintains optimum soil moisture level.

Apart from saving water and maintaining soil moisture level, use of micro-irrigation leads to lesser electricity consumption. On an average, use of micro-irrigation techniques can improve power efficiency by 30.5%. Researches have also shown that, micro irrigation system saves roughly 30%-40% of water and around 20% fertilizer. It can improve fertilizer consumption efficiency by 28.5% on an average and hence, enhances the yield by almost 20%.

In order to save water and increase productivity Government of India started promoting micro irrigation since 2005 with centrally sponsored scheme on micro irrigation. The various projects started by government are NMSA (National Mission on Sustainable Agriculture) and NMMI (National Mission on Micro Irrigation) which has now been merged with Pradhan Mantri Krishi Sinchayee Yojna (PMKSY). State government are also supporting through various state level schemes like Andhra Pradesh Micro Irrigation Project (APMIP), Gujarat Green Revolution Company (GGRC) etc.

All India Area covered Under Micro Irrigation; 2005-2015



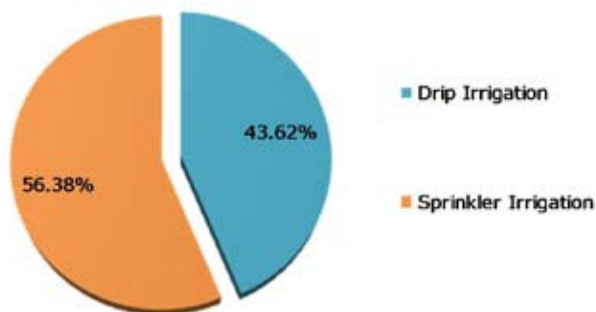
Source: Strategic Paper by IAI and FICCI

AREA COVERED UNDER MICRO IRRIGATION

All India

Micro irrigation has seen a steady growth over the years. Since 2005, area covered under micro irrigation systems has grown at a CAGR of 9.6% and reached 7.73 million hectare.

All India Area covered Under Micro Irrigation by Segments; 2015



Source: Mission for Integrated Development for Horticulture Website

However, penetration of micro irrigation systems is still very low in India. With half the cultivable land in the country still being rain-fed, there is mammoth potential for promoting micro irrigation.

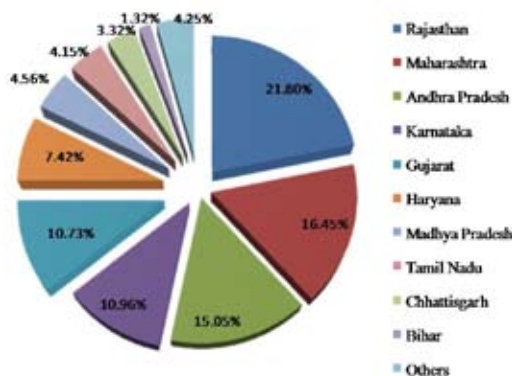
Majority of the area covered under micro irrigation systems comes under sprinkler irrigation with 4.36 million hectare while 3.37 million hectare comes under drip irrigation. Area under drip irrigation has shown stronger growth in recent years, growing at a CAGR of 9.85% during 2012-2015, while sprinkler irrigation has grown at a pace of 6.60% during the aforementioned period.

Top 10 States

The states with the largest area under micro-irrigation include: Rajasthan (1.68 mh), Maharashtra (1.27 mh), Andhra Pradesh (1.16 mh), Karnataka (0.85 mh), Gujarat (0.83 mh) and Haryana (0.57 mh).

Rajasthan has the maximum area under micro irrigation, whereas Haryana has the highest penetration rate of 16.3% in 2015.

Major States Area Covered Under Micro Irrigation by Segments; 2015

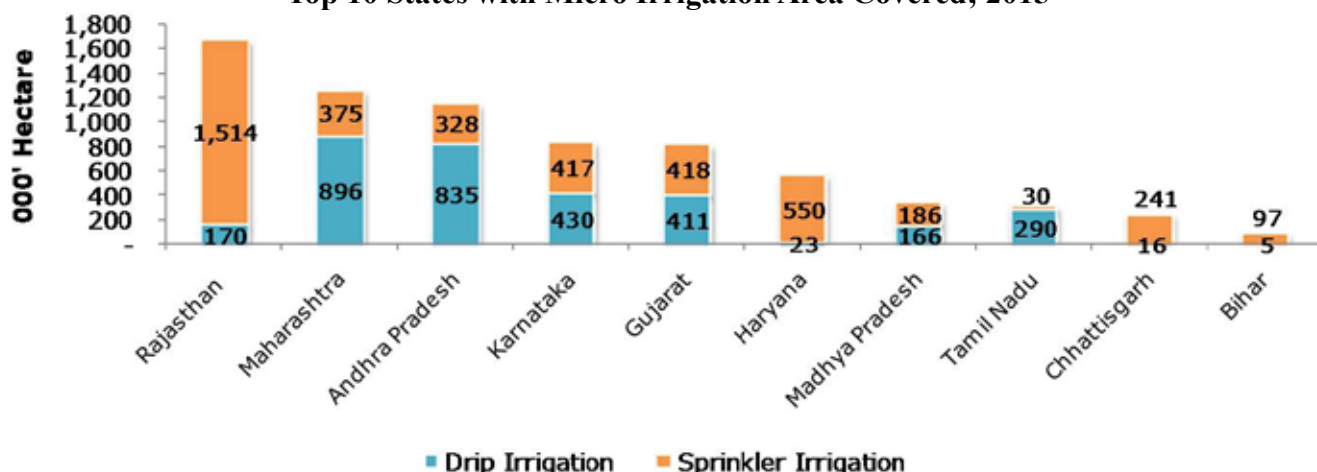


Source: Mission for Integrated Development for Horticulture Website





Top 10 States with Micro Irrigation Area Covered; 2015



Source: Mission for Integrated Development for Horticulture Website

Sprinkler irrigation is popular among Rajasthan, Gujarat, Haryana, Madhya Pradesh, Chhattisgarh and Bihar. However, drip irrigation is popular in Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu.

The following graph depicts the area under drip and sprinkler irrigation for the major states undertaking micro irrigation.

GOVERNMENT INITIATIVES

Recognizing the importance of micro irrigation, the government has taken various initiatives since 1992. The first real thrust however came in 2006, when the government launched a Centrally Sponsored Scheme (CSS) for micro irrigation with the objective to enhance water use efficiency in the agriculture sector by promoting appropriate technological interventions like drip & sprinkler irrigation technologies and encourage the farmers to use water saving and conservation technologies. In June, 2010, it was up-scaled to National Mission on Micro Irrigation (NMMI), which continued till the year 2013-



14. From 1st April, 2014, NMMI was subsumed under National Mission on Sustainable Agriculture (NMSA) and implemented as “On Farm Water Management” (OFWM) during the financial year 2014-15.

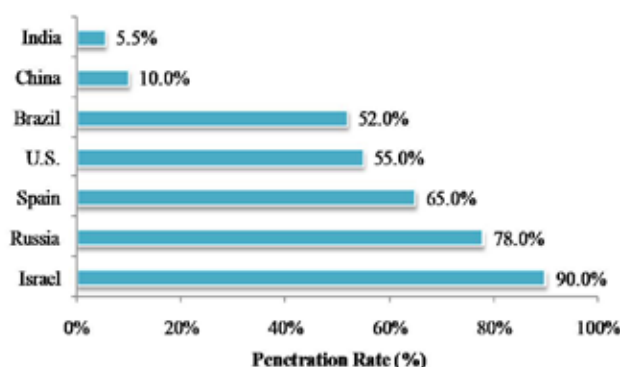
The Pradhan Mantri Krishi Sinchayee Yojna (PMKSY) was launched in July, 2015. The Cabinet Committee on Economic Affairs (CCEA), chaired by the Prime Minister gave its approval for the scheme for the period 2015-16 to 2019-20. The objective of the scheme is “to achieve convergence of investment in irrigation at the field level, expand cultivable area under assured irrigation.”

Under the above mentioned schemes, the growth in the states, where these schemes were implemented and has shown successful results are stated below.

INDIA’S POSITION IN THE GLOBAL MARKET

India now has close to 8 mh under micro irrigation. This is attributed to the large cultivable area and area under

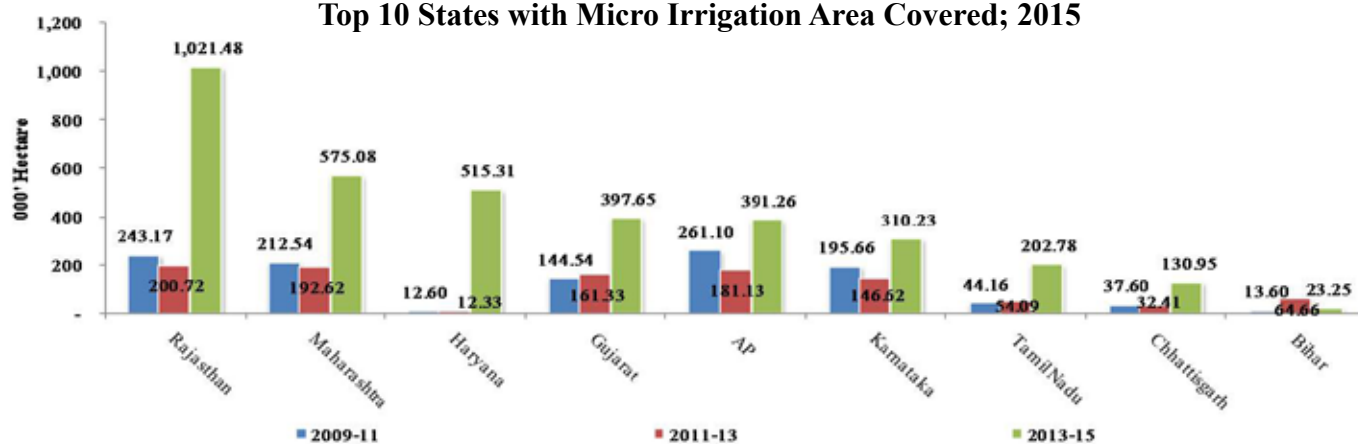
Total Area covered Under Micro Irrigation by Country; 2015



Source: Strategic Paper by IAI and FICCI



Top 10 States with Micro Irrigation Area Covered; 2015



Major States Area Covered Under Micro Irrigation; 2009-2015

irrigation. However, penetration of micro irrigation systems is still very low in India.

Penetration of micro irrigation in states of India is variant. The average penetration at the all India level is 5.5%, which is much lesser compared to countries like Israel, US and even China.

Israel has just 0.23 mh under micro irrigation, but represents a penetration of over 90%, which came as a result of an acute water shortage and a strong political will to use innovation in order to protect their water resources.

CONCLUSION

Till date, farmers have adopted micro-irrigation mainly for fruits, vegetables and other high-value crops that can provide a good return on the investment.

The most dramatic gains in this sector have occurred in China and India, the world's top two irrigators, where the area under micro-irrigation expanded 88-fold and 111-fold, respectively, over the last two decades. India now leads the world, with nearly 2 million hectares (about 5 million acres) under micro-irrigation methods.

Some of the impediments with our efforts to promote micro irrigation are firstly, lack of focus on micro irrigation as currently there is no dedicated programme for micro irrigation. Further, we also lack IT-backed operations like geo-tagging and referencing for tracking the progress.

In order to have sustainability in agriculture with shrinking natural resource base, especially water, micro irrigation is of extreme importance.



DELIBERATIONS



India's agriculture is still hostage to the vagaries of nature, with 60% of the sector dependent on rainfall. Today, India is considered to be a water stressed country. We were highly water-surplus in 1950s. This change has come mainly due to two reasons. First – increasing population; and second – highly wasteful flood method of irrigation (FMI). To arrest the decline in per capita water availability and per capita food grain availability, we need to increase production with judicious water use in farming. Micro Irrigation (MI) along with precision farming not only addresses the problem of water scarcity but also effectively save fertilizer consumption per unit of land and improves productivity. MI is the key to this looming water scarcity. Keeping in view these problems and their solution a national round table on micro irrigation was organized by Indian Council of Food and Agriculture (ICFA) on January 10, 2017 at India Habitat Centre, New Delhi. The intent of the meeting was to provide an active platform for discussion and consultation on major issues and trends pertaining to micro irrigation and precision farming to all the stakeholders including

the state and central government, industry, trade, credit institutions and public sector agencies as well as research institutes.

The conference was chaired by Dr. H.P. Singh, Chairman, Confederation of Horticulture Association of India (CHAI) with the presence of Dr. K. L. Chadha, President, The Horticultural Society of India and Chairman, ICFA Working Group on Horticulture, Dr. S. K. Malhotra, Agriculture Commissioner, GOI and other eminent personalities from the concerned sector.

Dr. MJ Khan, Chairman, ICFA opened the session by welcoming the distinguished guests and addressed the agenda and its prominence in farming sector. He also brought the focus to the necessity of sustainable agriculture in current scenario by pointing the importance of micro irrigation which provide significantly higher water usage efficiency due to proximity and focused application.

Dr. K.L. Chadha, President, The Horticultural Society of India and Chairman, ICFA Working Group on Horticulture initiated the deliberation with his valuable



introductory remarks. In his address he spoke of the issues in micro irrigation and precision farming to save the shrinking water as well as other natural resources.

Dr. S. K. Malhotra, Agriculture Commissioner, Department of Agriculture, and Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, GOI – At first he thanked ICFA for providing him the opportunity to present his views on such an important issue. Further, he initiated the talk by relating micro irrigation (MI) with the Prime Minister’s seven point strategy to double farmer’s income. The first and foremost point of this strategy was related to irrigation with the aim of “per drop, more crop” in other terms it was harmonized with micro irrigation. He emphasized on the necessity of water in agriculture sector as water was one of the most vital elements. But now days due to adverse effects of climate change, there was less rain fall which severely affects the agriculture. So in this scenario, it was needed to achieve an efficient way to use water along with high nutrient quantity.

He also put some light on the inception of MI in India; that how it was started. In India, It was started in 1980 and drip irrigation in 1985 along with the sprinklers. In 2006, Government of India started promoting MI by launching the Centrally Sponsored Scheme (CSS) on it. In June, 2010, it was up-scaled as National Mission on Micro Irrigation (NMMI) and in 2014 it was subsumed and renamed as National Mission on Sustainable Irrigation (NMSA). It was structured for enhancing agricultural productivity especially in rain fed areas focusing on integrated farming, water use efficiency, soil health management and synergizing resource conservation. In 2015, Hon’ble Prime Minister Mr.

Modi announces a very ambitious scheme; Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) with the vision of extending the coverage of irrigation ‘Har Khet ko pani’ and improving water use efficiency ‘More crop per drop’ in a focused manner with end to end solution on source creation, distribution, management, field application and extension activities. He also stated that out of about 141 m. Ha of net area sown in the country, about 65 million hectare (or 45%) is presently covered under irrigation.

Furthermore, he spoke about the state wise performance on MI and said that there was several states showed really good performance and improvement but some states needed a better implementation of better irrigation techniques. Consequently, on the basis of performance, the states were divided into two category; Good and Bad. The good and leading states were Andhra Pradesh, Gujarat, Karnataka, Tamil Nadu, Madhya Pradesh, Maharashtra, Rajasthan and Tamil Nadu and the bad or poorly performing were north eastern states, hilly states, Bihar and U.P. In addition, he also emphasized on recent guidelines on MI which were revised time to time to improve its potency on the basis of preconditions. The first revision in MI guidelines took place in 2006. Again these guidelines were revised in the year 2010 and 2014 to cover the wider aspects and still these were under revision.

He also opined that PMKSY is flagship scheme of Government of India with the mission of integration of water source, distribution and its efficient use for agriculture. According to this scheme, the 50% subsidy was allocated to the small and marginal farmers, 30% for women, 60-80% for SC and ST category as well



as 25 % of the fund was allotted to the Himalayan areas. Earlier only horticulture was covered under the scheme but now 25% funds were allocated to the other agriculture crops also. Informing about government latest policies, he said that a roadmap was prepared to cover the remaining 10 million hectare agriculture land under the PMKSY. For this, discussions were going on with industry for their assistance and support. In his converse, he also emphasized that MI was needed in both areas; where water was present in sufficient amount and the areas, where there was water scarcity. At the end, he talked about yet another technology led monitoring system that continuously monitor and manage the total area covered under the irrigation scheme. The system was known as Management Information System (MIS), with the help of this, the total irrigated area particularly how much area, districts or states covered was monitored constantly. This system structured with the cooperation of four ministries namely; Ministry of Agriculture & Farmers Welfare, Ministry of Water Resources, Ministry of Rural development, Ministry of Land Recourses along with the National Informatics Centre (NIC). He elucidated that MIS has been applied to collect the data on daily and monthly basis which includes the information about the individual field, farmer at district level.

Mr. Shrikant Goenka, Premier Irrigation Adritec Ltd. briefed about the initiation of micro irrigation (MI) in India and said that the pioneering work was majorly conducted by the industry which includes the organization of awareness and training programmes for farmers and it has also played a crucial role in partnership with government to implement and execute such schemes. He appreciated that government was very supportive by providing adequate subsidy to the farmers, but when we compared this subsidy to rest of the world, there was a marked difference. In India, agriculture touched the life of approximately 100 million farmers and it was a difficult task to benefit all those farmers. Therefore, it was needed to work continuously to improve the socioeconomic conditions of these people. In addition, he also stated that the various programmes on MI were continuously carried out from 1992 and for this constant effort; the credit goes to the farmer, government and the industry. He again restated PM's one of the most aspiring scheme; 'Har Khet ko pani' and 'More crop per drop' and said that industry was well aware of PM's vision and mission. He also informed the gathering that they published and circulated a White Paper on "Accelerating growth of Indian agriculture: Micro irrigation an efficient solution" with the support of Mr. Shobhana K. Pattanayak, Secretary, Department





of Agriculture, Cooperation & Farmers Welfare , Government of India.

Mr. Randhir Chauhan, Netafim Irrigation India Pvt. Ltd. spoke about Canal Command Areas (CCAs) that at least 10 percent or 40 hectares, whichever was maximum of each project should come under MI in lieu of On Farm Development (OFD) with no restriction on the upper limit. MI should be ensured to the maximum possible extent through change in cropping pattern, extension of command beyond areas under gravity flow. It was to include water efficient conveyance and field application devices like underground piping system, etc. for sprinklers, rain guns, pivots etc. He also stressed on the application of drip irrigation system rather than the surface irrigation itself. The system allowed for application of frequent but small quantities of water and therefore, a continuous supply of water throughout the day. One key reason for the superior performance of such system was the fact that these can neutralized the nutrients and level of water available to the crops, in contrast to the traditional surface irrigation systems, under which plants face stress as a result of feast and famine cycles.

Dr.H.P.Singh, Chairman, Confederation of Horticulture Associations of India (CHAI) started his address by giving the importance of water that it was a very critical and precious element for the survival of human from the beginning of civilization. Many civilizations were vanished due to lack of water. So therefore, integrated water management should be treated as a commodity. He also mentioned the existence of drip irrigation in



B.C. but further also regretted the fact that there was not much information available on this. In India, MI started in late 50s and sprinklers somewhere in 1965. The idea of drip irrigation was conceived much earlier in 1945 but came into existence in late 1980. In 1993, it was started with only 24-25 crore in Maharashtra for the first time and now it has increased up to 700 crore budget allocations and MI taken a major seat with very high percentage of subsidy based on category, community and locality.

In 2002, a task force was established to comprehensively examine the resource requirements for expanding irrigation and identifying a new approach to implement irrigation projects with the support of National Bank for Agriculture and Rural Development (NABARD). He also referred the example of Sh. Chandra Babu Naidu, Hon'ble Chief Minister of Andhra Pradesh; he set up a Task force on MI in 2004 which has estimated that potential existed for covering an area of about 69.5



million hectare under improved systems of irrigation such as drip and sprinkler irrigation. Further, he also mentioned the Capital Incentive Technology which reduced the cost of input in given time as in the case of banana which became highly profitable than other crops in some states like Gujarat, Maharashtra.

He also focused on the importance of MI in water sufficient areas also. For instance, he gave the example of a village in Utrakhand, where, there was plenty of water but people still uses MI system. Because they knew that plant needs water time to time, so MI system works better in such condition in comparison to conservational irrigation techniques and in crops like potato and banana, drip irrigation was very successful as it produces disease free plant.

Apart from this he also enlightened the delegates about the significance of precision farming and put in the picture that first conference on this issue was held in 2002 and detailed that how a farming management concept is based on observing, measuring and responding to inter and intra-field variability in crops. The goal of precision agriculture research was to define a decision support system (DSS) for whole farm management with the goal of optimizing returns on inputs while preserving resources.

In the meanwhile, he criticized the use of term subsidy. According to him subsidy should be replaced by the term assistance (as subsidy was a sum of money granted by the government to help the farmers to keep the price of a commodity or service low whereas assistance was the investment done for better output). In his concluding remarks he stressed on the need of promotion of MI to bring agriculture in forefront and also on the estimation of its advantages that how it will generate employment; who will be benefitted and how it double the farmer's income.

Mr. Ramesh Deshpande, CEO, India Agriculture Group International, USA pitched that there should be no categorization in fund distribution. Fund allocation was done with equality for progressive farmers like in Punjab. He suggested that for the sustainable use of water resources, we could analyze the model as applied in international programmes on integrated water management and watershed management.

Dr. M. Moni farmer Director General, National Informatics Centre & Chairman-ICFA: Working Group on ICT briefed about his tenure as Deputy Director, NIC when the MI scheme was at first announced. At that time, he wrote an approach paper that how we should go beyond for the successful accomplishment of MI in Indian scenario. He also highlighted the need of one page note for every farmer regarding the water collection, quality and quantity. He also very keenly supported subsidy for every crop not only for few selected one. According to him, integrated farm health management and integrated water management system was necessary for every crop along with a beneficiary wise farmer's database.

In between, Mr. Deshpande also mentioned about a ground water availability scheme that was launched by World Bank in 1991, likewise a water resource programme on MI for approximation of water availability was also needed. He also stressed that water should be priced and treated as commodity. A national policy on water management should be there to decide the pricing of water (if it was acceptable to government). Projects should be conceptualize for lifting water from command area and transfer it to water scarce area and further use it in MI. In addition, he also proposed to the thought of constitution of centrally sponsored states for the demonstration of latest machinery and techniques of MI.

Mr. S. K. Makhija, Advisor, Jain Irrigation System Limited started his talk with the reference of Dr. L. P. Singh and his contribution in the foundation of National Committee for Plasticulture Application in Horticulture (NCPAH) and focused on their coordinated approach to popularize adoption of various MI and precision farming applications in horticulture & over all development of plasticulture applications in the country.

Besides, he also added that due to lack of conformity in policies in state and central government, most of the MI schemes were ended abruptly. There were some states like Gujarat, which have very methodical process, but they were unprofitable for industry to sustain. He also opined that subsidy should be for the assistance of industry to sustain. In his words "we need to work more, we only work when there was drought or other calamities". Additionally, he emphasized on the



productive use of water like Gujarat and Maharashtra. Hence, there was a need of serious thinking with segregation of agriculture from state subject to the subject of central government to lessen the problems. At the end of his address, he pointed out the need of canal system to reduce water wastage and suggested to replace the canals with pipe outlets in similar way as used in Germany and Israel.

Mr. Arun Jajodia, Proprietor, Tirupati Sprinklers pointed that we always talk about the land area in terms of quantity but we never focused on the quality. Now, it was need of the time to analyze the quality instead of quantity to work at ground level to improve the irrigation sector of our country.

Mr. Pradeep Barah, Vice President, Premier Irrigation mentioned that recently he attended a conference on horticulture at Assam and observed that people did not come forward for MI because of lesser subsidy. He urged that central government initiate some programme to promote MI in eastern and northeastern part of India, if we target to cover 10 million hectare area in coming years then definitely, we have to cover these states also.

Dr. T.B.S. Rajput, Principal Scientist, Water Technology Center, IARI talked about a project in which he was working around 20 village with small farmers (most of them were migratory from Pakistan) that how efficiently they adopted MI and benefitted although, all of them were familiar and trained in MI practices. Apart from this, he also reaffirmed that drip irrigation was the only option in some place; hence it should be adopted for better results. He also underlined that various scheme on watershed management starts colorfully but ended shortly due to the lackadaisical approach of government. Since, watershed management programmes were implemented by three different departments with different guidelines. It was required to have same guidelines to help the mobilization and support of the industry. At the end, he completely disregarded the water pricing policy as suggested by Mr. Deshpande. He said that pricing of water is a big no instead of it; its sustainable use should be promoted.

Dr. C. Vasudevappa, Vice Chancellor, University of Agricultural and Horticultural Sciences, Shimoga, Karnataka briefly suggested that sprinklers were

very effective way of irrigation but unfortunately in Karnataka there was wide difference in subsidy. On some crop there was no subsidy or very negligible while on the crops like banana there was 90% subsidy. Due to this incongruence, farmers were reluctant to adopt the sprinklers for some seasonal crops. He suggested that the subsidy should be reduced to 50% but provided for all the crop and people without differential treatment. There should be a common guideline for all the crops and states too. One more important point he put forwarded; was the maintenance of MI instrument as these were used for one crop and then just dumped in the field without maintenance. Though, this machinery should be taken care of. In this regard he recommended the provision of a skill development programmes on repair, training and maintenance of MI instruments. He also stressed on the realistic application and approach of MI in Command Areas Development (CAD) Programme. The tail-end people (farmers who have land at the end of the canal system) who hardly get any water can also store water by CAD for other crops. In these areas, it was needed to uphold the canal system. He also said that fund distribution should be fair enough and moreover it required selection of distributaries as the investment constrain were always there.

Mr. Anil Kaushal, Vice President-Marketing, Automat Industries (P) Ltd also reaffirmed the maintenance of machinery used in MI to achieve the better output and emphasized on the need of quality technicians for proper maintenance of MI systems as it also create job opportunity for youths. He said that there should be a proper guideline for the use of machines along with the mandatory certification from a reputed organization and certain funds must be granted for this purpose. Power source was yet another aspect of MI in terms of electricity consumption. He also insisted on the promotion of automation of irrigation machinery for recovered results.

Mr. Rajeev Rajan, Founder & Director, Agpulse Organics brought the focus on the role of quality of ground water in irrigation system and insisted that water quality should also be monitored whether it was good for irrigation or not. Soil and water testing ought to be analyzed regularly to nearby university lab or KVKs.

In his concluding remark, Dr. Malhotra, Agriculture Commissioner, GOI mentioned the initiatives taken by

GOI which include betterment of quality aspect and sale services. It would be mandatory for the service provider to assist the buyer for the next 3 year free of cost along with appropriate operation and installation manual. He also briefed about the new draft guidelines for irrigation reforms which included 60% subsidy granted by central government and 40% from state government. Apart from this, necessary measures have been taken for enhanced output of Credit Guarantee Fund and Back End Credit Link. He also reemphasizes on the periodical testing of samples at Bureau of Indian Standards (BIS) along with the compulsion of fertigation in MI system installation.

At the end of the session, the following major issues and recommendations were summarized by Dr. K. L. Chadha:

- There is no dedicated scheme on MI, it's just a component of PMKSY. Therefore, a separate scheme was needed to further aggregate the efforts to improve and cover more area under MI.
- Constituting an advisory and consulting committee to further promote and improve the MI in states like Bihar, U.P. together with the north eastern region by providing technical assistance.
- Construction of MI structures to supplement source creation activities and secondary storage structures at the tail end of the canal system (to store water when available in abundance or from perennial sources) could also be done for use during the dry periods.
- Emphasis should be put on the drip irrigation and sprinklers rather than the surface irrigation and it was also recommended that drip irrigation was particularly suitable in several crops like, banana, potato as it also control diseases incidence.
- Task force on Micro Irrigation could be a solution to maintain steady and stable performance in productivity as it will help to estimate total irrigation area with an objective to emphasize on all aspects of water conservation.
- Allocation of funds needs to be done without any categorization to promote other crops too. While selecting the beneficiaries, care should be taken to ensure that the small & marginal farmers were given due priority for supplying the system. Further, it was highlighted that there should be a common guideline of subsidy for all the crops and states.

- The Command Area Development policy can also potentially be a game changer for the industry. While there were policies in place currently, there are a few amendments to these that could help the spread of MI.
- A thorough analysis was also required to identify the weak area and major constraints which hinders the progress of MI schemes before drafting any other blueprint.
- Stress should be given to implement Capital Incentive Technology to reduce the input cost which could lead to profitable harvest.
- Integrated farm health management and integrated water management system should be necessary for every crop along with a beneficiary wise farmer's database.
- Regular monitoring of quality of ground water at laboratory level is also required.
- Crops like sugarcane inappropriately consume water in large amount; such crops should be irrigated by water efficient system. Thus, farmers should be provided this type of information also.
- Schemes like Credit Linked, Back-Ended Subsidy and Credit Guarantee Fund Trust for Micro and Small Enterprises should be promoted and extended with the help of state and central agencies along with the industries, cooperatives, NGOs.
- One more important point came forward was the maintenance and repairing of MI instrument. To overcome this problem, quality technicians are needed with proper skill and for this a national level skill development programme is required.
- For service providers, it will become mandatory to assist the buyer (farmers) in operation and installation of the MI system for the next 3 year without any cost along with appropriate guideline.

Lastly, it was requested that all the participants send few recommendations which could have been missed during the discussion and could be included in final draft.

The formal vote of thanks was presented by Dr. M.J. Khan with gratitude to Dr. H.P. Singh for his genial presence and commendable remarks. Further, He thanked all other participants for their significant time and active cooperation and success of the meeting.



MAJOR RECOMMENDATIONS

1. A detailed information about water bodies as source of irrigation and water health is essential. The comprehensive Database on Water bodies and on Water Health Parameters has been initiated with an Irrigation Portal having district level water requirement and water released to calculate the total consumption and identify area with maximum and minimum water usage under District Irrigation Plans under PMKSY. This comprehensive information from all the districts must be efficiently utilized for better planning and judicious use of water.
2. There is a need to sensitize farmers and make them realize the depleting water resources of the country, hence the urge to shift to water efficient technologies for cultivation. In accordance, government should initiate an awareness campaign to sensitize farming community about MI as water efficient system for cultivation and its benefits to mentally prepare them for adoption of technology.
3. Farmers lack technical know-how of operating the MI systems especially IT based resulting in inadequate utilization of the system and improper handling leading lesser life of the system. It should be made mandatory for firms providing infrastructure for microirrigation to train the beneficiary about usage and handling of system with proper manual.
4. To safeguard the investment made by farmer on MI system, provision for ensured maintenance service of MI system by the firm for at least 3 years should be made to provide hassle free service to farmers.
5. SAUs and other institutes should initiate diploma courses for imparting skill of operating and maintaining micro irrigation systems to rural youth, this will provide employment to youth as well as create local service providers.





LIST OF PARTICIPANTS

1. Dr. S. K. Malhotra, Agriculture Commissioner, Government of India
2. Dr. H. P. Singh, Chairman, Confederation of Horticulture Associations of India (CHAI)
3. Dr. K. L. Chadha, President, The Horticultural Society of India and Chairman
4. Mr. Primal Oswal, President, Irrigation Association of India
5. Dr. T.B.S. Rajput, Principal Scientist, Water Technology Center, IARI
6. Mr. S. K. Makhija, Advisor, Jain Irrigation
7. Dr. M. Moni former Director General, National Informatics Centre
8. Mr. B.P.Singh, Secretary, Litchi Grower Association
9. Dr. Akhilesh Kumar, Founder & CEO, Eden Horticulture Services
10. Mr. Arun Jajodia, MD, Tirupati Pipes
11. Mr. Ayush Jajodia, Tirupati Pipes
12. Ms. Sagarika Gandhi, Project Consultant, International Livestock Research Institute (ILRI)
13. Mr. Srikant Goenka, Premier Irrigation Adritec Ltd
14. Mr. Randhir Chauhan, Netafim Irrigation India Pvt. Ltd
15. Mr. Ramesh Deshpande, CEO, India Agriculture Group, Washington DC
16. Dr. C. Vasudevappa, VC, University of Agricultural and Horticultural Sciences, Shimoga,
17. Mr. Pradeep Barah, Vice President, Premier Irrigation
18. Mr. Anil Kaushal, Vice President-Marketing, Automat Industries (P) Ltd
19. Mr. Rajeev Rajan, Founder & Director, Agpulse Organics
20. Mr. Sudhir Gupta, Member, Board of Millennium Alliance
21. Mr. Pradeep Lath, Director, Nimbus Pipes
22. Dr MJ Khan, Chairman, Indian Council of Food and Agriculture
23. Mr. NS Randhawa, Executive Director, Indian Council of Food and Agriculture
24. Mr Vishnu Rathore, CEO, Indian Council of Food and Agriculture
25. Mrs Mamta Jain, Director, Indian Council of Food and Agriculture
26. Dr Sucheta Arora, Director-Organization and KM, Indian Council of Food and Agriculture