Status of Andhra Pradesh micro irrigation project-An empirical study

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ABSTRACT

No doubt that the Andhra Pradesh Micro Irrigation Project (APMIP) did a see change in agriculture by bringing major portion land under cultivation and creating the awareness about various benefits of micro-irrigation in the farming community to prove the slogan more crops per drop.

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INTRODUCTION

Water is the most important natural resource, an essential human need and a valuable national asset. Planning, development and management of water resources need to be governed by national perspectives. Water is part of a larger conservation system. Realizing the scarcity and importance attached to the fresh water, it has to be treated as an essential requisite for sustaining all life forms. The scarce and precious national resource, water is to be planned, developed, conserved and managed as such, and on an integrated and environmentally sound basis, keeping in view the socio-economic aspects and needs of the states. As the country has entered the 21st century, efforts to develop, conserve, utilize and manage this important resource in a sustainable manner, have to be guided in the national interest. Planning and implementation of water resource projects involve a number of socio-economic aspects and issues such as environmental sustainability, appropriate resettlement and rehabilitation of project affected people and live stock, public health, concerns of water impoundment, dam safety etc.

Complex issues of equity and social justice in regard to water distribution and management are required to be addressed. The development and over-exploitation of groundwater resources in certain parts of the country have raised the concern and need for thoughtful and methodical resource management and conservation of water.

It is a fact that no living being can exist without freshwater on earth, you see how valuable this resource is – and how much we need to protect it. The water plays input role in agriculture, manufacture of essential commodities, generation of electricity, transportation, recreation, industrial activities, etc. Though water is definitely inexhaustible gift of nature, to ensure easy access to it for all the time to come, it becomes compulsory to maintain, conserve and use the resources very vigilantly in every sphere of life. Although disproportionately distributed, the world has plenty of water resources. However, mismanagement, limited resources and environmental change causes, that 20 per cent of the cultivatable land still lacks access to proper irrigation. These people are among worlds poorest. Over half of them live in China

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and India. Realizing the increasing importance of water, the United Nations General Assembly has declared the period 2005-2015 as the international decade for action for 'Water for Life'.

About 80 per cent of all available fresh water is used for agriculture. Globally over pumping of groundwater by the farmers exceeds natural replenishment every year. Agricultural sector takes a massive amount of water to produce crops, three cubic meters to yield just one kilo of rice, and 1000 tons of water to produce just one ton of grain. For the last half a century, agriculture's principal challenge has been raising land productivity getting more crops out of each hectare of land. As we have stepped into the twenty first century, the new frontier is boosting water productivity getting more from every drop of water devoted to crop production. There is a need of long and growing list of measures that can increase agricultural water productivity. The key issue is, to design strategies to fit the farming culture, climate, hydrology, crop choice, water use pattern, environmental conditions, etc. Land and water resources are the basic needs of agriculture and economic development of any country. The demand for these resources will continue to grow due to ever increasing population. Further, the per capita availability of these resources in India is much less compared to many other countries. In India, it is estimated that out of 170.4 M ha of degraded lands 50.7 M ha have become wastelands producing little biomass. These vast degraded and wastelands in the country need to be developed at the earliest. Micro-irrigation is the one of the ways to bring more and more land under cultivation with limited water resources. All this would need water for irrigation and the optimum use of available scarce water must be made to bring maximum possible land under cultivation.

The world and more significantly the developing countries are heading towards water stress and scarceness. They are left with no alternative but to adopt modern irrigation technologies, which save water, increase the area under irrigation, and to improve yields. In India more than 80 per cent of the total water is used for agriculture with very low irrigation efficiencies. It is expected that the next decade, there will be cut off about 10 per cent irrigation water for meeting ever-increasing demand from domestic, industrial and other sectors. The need of the hour is, therefore, to maximize the production per unit of water used, besides affecting utmost economy in crop water use. Adoption of innovative irrigation technologies (sprinkler and drip irrigation systems) on a large scale will help in improving the water use efficiencies substantially micro irrigated agriculture profitable.

The pace of growth and development of agriculture mainly depends on the well structured irrigation management and availability of infrastructure *i.e.* power. The India's agricultural sector is facing a severe problem of inefficient irrigation system from the gross root level. Irrigation is the artificial application of water for the cultivation of crops, trees, grasses and so on. The world over, the irrigation sector is the largest user of water – almost 80 per cent of the water in the world is taken up by irrigation. However, in India, the irrigation sector uses 85 per cent of its available water resources because the majority of the population in the country living in villages and depending on agriculture to a maximum extent. Indian farmers gain access to irrigation from two sources-surface water *i.e.* water from surface flows or water storage reservoirs, and groundwater *i.e.* water extracted by pumps from the groundwater aquifer through wells, tube wells and so on. Surface irrigation is largely provided through large and small dams and canal networks, run-off from river lift irrigation schemes and small tanks and ponds. Canal networks are largely gravity-fed while lift irrigation schemes require electrical power. Groundwater irrigation is accessed by dug wells, bore wells, tube wells and is powered by electric pumps or diesel engines. To meet the growing needs of irrigation, the government and farmers have largely focused on a supply side approach rather than improve the efficiency of existing irrigation systems.

Agriculture is the backbone of Indian economy because of its high share in employment generation and livelihood creation notwithstanding its reduced contribution to the nation's GDP. The share of agriculture in the gross domestic product has registered a steady decline from 36.4 per cent in 1982-83 to 15.7 per cent in 2008-09. Yet this sector continues to support more than half a billion people providing employment to 52 per cent of the workforce. It is also an important source of raw material and demand for many industrial products particularly fertilizers, pesticides, agricultural implements and a variety of consumer goods. Growth of agriculture over a period of time remained lower than the growth in non-agriculture sectors and this decelerating trend is the main cause for concern. The gap between the growth of agriculture and non-agriculture sector began to widen since 1981-82, and more particularly since 1996-97, because of acceleration in the growth of industry and service sector.

The severe drought situation in the country during the liberalized era made the government of India to plan systematic and scientific management of water resources to meet the rising needs of agricultural sector. As a product

of scientific water management, the Micro-irrigation technology came into existence in the country. As per the constitution of India, the development and management of agriculture is the state policy rather than the central government, it is only a monitoring and funding agency with different plans and schemes through state governments for the development of agricultural sector in the interest of nation building.

Micro irrigation:

Micro irrigation is an irrigation method that applies water slowly to the roots of plants, by depositing the water either on the soil surface or directly to the root zone, through a network of valves, pipes tubing and emitters. Drip and sprinkler irrigation are the two technologies of Micro irrigation. Drip irrigation was used in ancient times by filling buried clay pots with water and allowing the water to gradually seep into the soil. A new technology of drip irrigation was then introduced in Israel with the advent of modern plastics after the world war II. The micro-sprayer concept was developed in South Africa to contain the dust on mine heaps. Both of them save conveyance losses and improve water application efficiency by applying water near the root zone of the plant. Drip systems convey water in small quantities through drippers/micro-tubes. Drip irrigation also known as trickle irrigation is very flexible and permits controlled, high frequency irrigation. It is possible to maintain the moisture content in the root zone of the plant near to the field capacity, which is not possible with other irrigation methods. The sprinklers are pressurized systems where a fountain or spray of water is released by the sprinkler which is connected by pipes, resulting in foliar irrigation. In brief micro-irrigation is an irrigation method that applies water slowly to the roots of plants, by depositing the water either on the soil surface or directly to the root zone, through a network of valves, pipes, tubing, and emitters (Fig. 1).

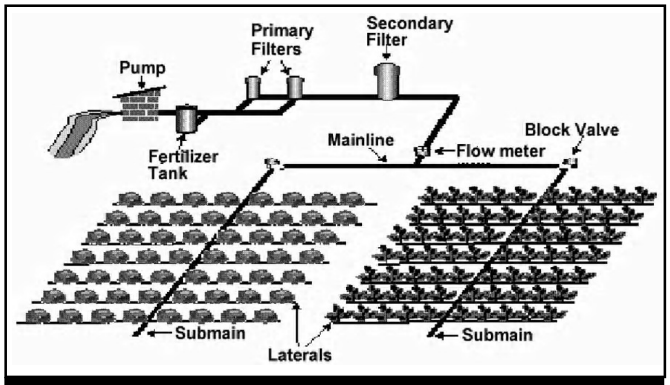

Fig 1 : Components of a micro-irrigation system

Micro irrigation status in the world:

Water gives life and it is also crucial to development of the world. Water is useful to the fields, nurtures the crops and stocks, provides recreation, it support mines, industry, electricity generation and it provides life for plants and animals that make up ecosystems. Irrigated agriculture plays a major role in the livelihoods of nations all over the world and although irrigation is one of the oldest known agricultural techniques, improvements are still being made in irrigation methods and practices. During the last three decades, micro irrigation systems made major advances in technology development and the uptake of the technology increased from 3 Mha in 2000 to more than 6 Mha in 2006.

Table 1: Area covered under micro irrigation in the world

Year	1981	1986	1991	2000	2006
Area (ha)	4,36,590	10,30,578	18,26,287	32,01,300	60,89,534

Source: ICID website www.icid.org

Sprinkler irrigation is a method of applying irrigation water which is similar to rainfall. Water is distributed through a system of pipes usually by pumping. It is then sprayed into the air and irrigated entire soil surface through spray heads so that it breaks up into small water drops which fall to the ground.

Sprinklers provide efficient coverage for small to large areas and are suitable for use on all types of properties. It is also adaptable to nearly all irrigable soils since sprinklers are available in a wide range of discharge capacity.

In India, the sprinkler irrigated area was 0.23 Mha in 1985 which grew to 0.67 Mha by 1998 (INCID,1998). As per the 2005 survey carried out by the National Committee on Plasticulture Application in Horticulture (NCPAH), the sprinkler area has dramatically increased to 1.63 million ha (Kulkarni *et al.*, 2005). In 1985 only 1000 hectares were under drip/micro irrigation which rose to 35,000 hectares in 1990, 152,930 hectares in 1995, 350,850 hectares in 2000, and about 500,000 hectares by 2005. With a few exceptions, almost all sprinkler and micro irrigation systems are served by groundwater structures (open dug wells and tube wells). Although the micro irrigated area has grown 15 times during the last fifteen years, the rate of adoption is far from its potential. The Ministry of Agriculture has estimated an ultimate potential area (harvested) for micro and sprinkler irrigation as 27 million ha and 42.5 million ha, respectively (GOI, 2004). The Ministry has proposed to bring 17 million ha under

pressurized irrigation in the country, comprising 12 million ha under micro irrigation and 5 million ha under sprinkler irrigation by the end of 11th Five Year Plan period (2007-2012). This is expected to result in an annual water savings of 58.6 billion cubic metres.

Benefits of micro-irrigation:

– The increase in yield for different crops ranges from 27 per cent to 88 per cent and water saving ranges from 36 per cent to 68 per cent vis-à-vis conventional flow irrigation systems.

– It enables farmers to irrigate more area than under conventional systems, since it can irrigate adequately with lower water quantities.

– It saves costs of hired labour and other inputs like fertilizer.

– It reduces the energy needs for pumping, thus reducing energy per ha of irrigation because of its reduced water needs.

Andhra Pradesh micro-irrigation project (APMIP): Status:

To give out the aforesaid fruits of micro-irrigation to the farmers, the government of India was keen to implement the micro-irrigation projects effectively as a part of new economic and agricultural policies. As a part of micro-irrigation project implementation in the country, the Government of Andhra Pradesh inaugurated the Andhra Pradesh micro-irrigation Project (APMIP) on November 3rd 2003, the first and largest comprehensive Micro Irrigation Project in India to bring 2.50 lakh ha under micro-irrigation. This project achieved coverage over 2.20 lakh ha and contributed significantly for the management of limited water leading to sustainable agriculture in the state. Implementation of APMIP has created great awareness about micro-irrigation among the farmers in the state. Large number of farmers have realized the benefits of micro-irrigation in terms of improvement in yields, water saving and reduction of labour requirement. In implementation of micro-irrigation project the Anantapur district in Andhra Pradesh got first place. In order to present the progress of the project (APMIP) in the state of Andhra Pradesh, the current study is undertaken. The programme aims to cover the majority of cultivating land in the state with the limited water resources. The project recommended for different crops such as mango, sapota, coconut, cashew nut, sweet orange, acid lime, guava, banana, papaya, vegetables, chilli,

Table 2 : District wise area covered drip + sprinkler from Nov., 2003 to March, 2008

Sr. No.	District	Area in ha			Rank
		Drip	Sprinkler	Total	
1.	Srikakulam	1,406	2,322	3,728	22
2.	Vizianagaram	3,703	2,777	6,480	20
3.	Vishakapatnam	2,960	1,723	4,684	21
4.	East Godavari	5,248	1,326	6,575	19
5.	West Godavari	10,133	3,012	13,145	10
6.	Krishna	6,932	4,254	11,186	11
7.	Guntur	3,823	2,886	6,710	18
8.	Prakasam	6,369	3,890	10,259	13
9.	Nellore	5,347	4,289	9,636	14
10.	Chittoor	16,692	5,976	22,668	5
11.	Kadapa	14,291	5,826	20,117	6
12.	Anantapur	47,606	35,823	83,429	1
13.	Kurnool	7,265	8,822	16,087	7
14.	Mahaboob Nagar	21,017	12,176	33,193	3
15.	Ranga Reddy	8,277	7,228	15,505	8
16.	Medak	13,083	10,049	23,132	4
17.	Nizamabad	5,706	2,900	8,606	16
18.	Adilabad	2,620	8,506	11,126	12
19.	Karim Nagar	4,496	4,081	8,578	17
20.	Warangal	5,483	3,487	8,969	15
21.	Khammam	9,952	4,369	14,321	9
22.	Nalgonda	34,344	3,818	38,162	2
Total		2,36,754	1,39,540	3,76,294	

Source: Official records of the APMIP office

groundnut, sugarcane, cotton, tobacco, sunflower, teak, pulses, etc. The AP government started this project by providing subsidy ranging from 50 per cent to 90 per cent based on the nature of crop and status of the district in agricultural development to the agricultural families, however the subsidy should not exceed Rs. 50,000/- per family. It is clear from Table 2 that what extent the project covered in the state of Andhra Pradesh during the period 2003 – 2008.

The present study is an in-depth investigation of the implementation of Andhra Pradesh Micro Irrigation Project in all the districts of the state and the study is under taken with the financial assistance of Indian Council of Social Science Research (ICSSR), New Delhi.

It is evident from Table 2 that the Anantapur district stood first in implementing APMIP with an area covering 83,429 ha, followed by Nalgonda (38,162ha), Mahaboob Nagar (33,193ha), Medak (23,132ha), Chittoor (22,668 ha), Kadapa (20,117ha), Kurnool (16,087ha), Ranga Reddy (15,505ha), Khammam (14,321ha), West Godavari (13,145 ha), Krishna (11,186ha), Adilabad (11,126ha), Prakasam (10,259 ha), Nellore (9,636ha), Warangal (8,969ha), Nizamabad (8,606ha), Karim Nagar (8,578ha), Guntur (6,710 ha), East Godavari (6,575ha), Vizianagaram (6,480ha), Vishakapatnam (4,684ha) and Srikakulam (3,728 ha).

Conclusion:

The survival and growth of agriculture is totally based on the proper management of scarce water resources in the nation. Proper and effective irrigation system is the only solution to improve the agricultural production. It was found and concluded from the studies and also the report of the agricultural scientists and the policies of the rulers that the micro irrigation is one of the ways for the proper utilization of scarce water resources and sustainable development of agriculture. Andhra Pradesh government introduced APMIP as the panacea for all the problems of water management in all conditions. The government implemented Andhra Pradesh Micro Irrigation Project (APMIP) successfully in almost all the districts of the state since November 2003, it is also very important to note that the awareness camps should be organized by the government from time to time through proper channel to reach at grass root level. The world statistics also show the growing trend of micro irrigations system has to bring more area under cultivation and to achieve higher productivity. No doubt, proper and effective educational camps at all stages about the micro irrigation system will improve the productivity and the financial conditions of the farmers.

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