1. INTRODUCTION

In many parts of the world, the demand for available water resources is fast exceeding the economic supply, and the competition among the various sectors of the economy for the scarce water is becoming intense. In response to these conditions, policymakers, researchers, NGOs and farmers are increasingly pursuing various innovative technical, institutional and policy interventions to enable the efficient, equitable and sustainable utilization of the scarce water resources. Microirrigation technologies are believed to be one of the innovative intervention approaches. Originally, microirrigation was often associated with the capital intensive, commercial farms of wealthier farmers. The systems used on large farms, however, are unaffordable for smallholders and are not available in sizes suitable for small plots. Recently, these technologies have gone through technical transformation from largely sophisticated and capital-intensive features to an almost input mode (Polak et al., 1997; Verma et al., 2004; Shah and Keller 2002).

A survey of literature on the impacts of microirrigation technologies indicates that they are usually promoted primarily for one or more of the following objectives;

1. As means to save water in irrigated agriculture and avert the crisis of water scarcity,
2. As a strategy to increase income and reduce poverty among the rural poor and
3. To enhance the food and nutritional security of rural households (Narayamoorthy, 2003; Polak et al., 1997; Shah and Keller 2002; Bilgi, 1999; Upadhaya, 2003, 2004).

The income and poverty reduction effects of microirrigation technologies are attained through substantial increases in farm income due to higher crop yields, better output quality, early crop maturity, realization of higher unit output prices and reduced cost of cultivation; particularly for operations like irrigation, fertilization, pumping water and weeding. Microirrigation technologies today worldwide including India are adopting in wide variety of crops viz, fruit and orchard crops, vegetables, flowers, commercial field crops, tuber & bulb crops, plantation crops, spices & condiments, forestry, nurseries, landscape etc. and under diverse situations such as arid, semi-arid, desert climates; problem soils etc. Marginal quality waters like saline water and agro-industry effluents are also being used today successfully with drip irrigation for raising several crops. Further microirrigation technologies enable the production and consumption of vegetables, particularly leafy vegetables, which are usually missing in the traditional staple diets of many cultures particularly tribals in remote areas. However, the much espoused water saving attribute of microirrigation technologies is contentious.

There are two lines of thought regarding the water saving potential of microirrigation technologies. The first line of argument is that the adoption of microirrigation technologies results in net water savings, which is attained through substantial reduction in losses due
to deep percolation, evaporation and inefficient field conveyance and distribution systems. For instance, water application can be reduced by 45-94% through the drip method of irrigation (Sivanappan, 1994 and Annual report of WMS, 1997). Water saving is the main motive for the state governments of India to embark on the massive popularization of microirrigation technologies. However, the farmers’ rationale for adopting these technologies may be different from the government’s policy objectives.

The second line of thought is that even though microirrigation technologies can result in water savings at the plot or field level, it may not translate into net water savings at a higher level of spatial scale such as the watershed or the basin (Molden et al., 2003). According to this line of thought, even at the plot level, the net water savings could be only modest if the phenomenon of return flows, much of which goes to recharge the underground water source, is considered. Thus, the adoption of microirrigation technologies may not automatically lead to real water savings. Various studies in India have shown a considerable return to farmers’ investment in microirrigation technologies (Dhawan, 2002; Narayanamoorthy, 1997; Verma et al., 2004; Sarkar and Hanamashet, 2002) and substantial efforts have been made by both national and state governments to disseminate these technologies through encouraging private sector participation in the manufacturing and distribution of the technologies and providing subsidies.
1.1 SCOPE OF THE STUDY

Recognizing the benefits of microirrigation technologies the Government of Andhra Pradesh has launched a large scale microirrigation project known as “Andhra Pradesh Microirrigation Project” (APMIP) on 3rd November 2003 encompassing 22 districts covering four sectors viz., horticulture, agriculture, sericulture and sugarcane. The initial target of the project was 0.247 million ha with a financial out lay of Rs. 1187 crores. Since it’s commissioning in November 2003, the area coverage up to March’ 2010 under APMIP sums up to 0.420 million ha under drip. Further APMIP being the first mega project in the world in terms of size involving farmers with a land holding size of as low as 0.5 ha to 2 ha, it was intended to assess the impact of adoption of microirrigation technologies such as drip by beneficiary farmers in the state of Andhra Pradesh, India.

1.2 THE SPECIFIC OBJECTIVES OF THE PRESENT STUDY ARE;

1. To analyze the impact of adoption of drip irrigation technology by farmers on productivity of fruits, sugarcane and vegetables by comparing it with conventional non-drip irrigated fields,

2. To assess the efficiency of water, electricity and fertilizer use under drip and non-drip irrigated fruits, sugarcane and vegetable crops cultivation,

3. To analyze the economic viability of drip system investment in fruits, sugarcane and vegetable crops,
4. To investigate the salinity and nitrate-N distribution in the soil profile under drip and conventional (non-drip) irrigated cropped farmers fields,

5. To assess the extent of nitrate contamination in ground water sources from wells located in drip irrigated and conventional (non-drip) irrigated cropped fields.