



## Impact of Andhra Pradesh Micro irrigation Project on the Farm Returns of Selected Farmers

### KEYWORDS

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**ABSTRACT** *The APMIP aims at improving the economic conditions of the farmers by conserving water, bringing additional area into cultivation with the available water resources, enhancing the crop productivity and production, quality, facilitating judicious usage of ground water, saving in power consumption and cost of cultivation. APMIP is being implemented with the assistance from Government of India, State Government and farmer contribution. In view of the deficit Rainfall, Rain shadow regions, unpredictable rains and considerable depletion of ground water, the farming community realized the need to adopt the technologies of Micro Irrigation to achieve the concept of "More crop per Drop". Government of Andhra Pradesh has set a goal to cover the entire potential area available in all the 13 districts of Andhra Pradesh under Micro Irrigation, within the next five years. Keeping in view of this the present paper makes an attempt to study the progress made under APMIP in Andhra Pradesh.*

### 1. Introduction

Water is becoming increasingly scarce in many parts of the world and thereby limiting agricultural development. The capacity of large countries like India to efficiently develop and manage water resources is likely to be a key determinant for global food security in the 21st century. In India, almost all the easily possible ways for viable irrigation potential have already been tapped. However, the water demand for different sectors has been growing continuously and demand management becomes the overall key strategy for managing scarce water resources. Since agriculture is the major water-consuming sector in India, demand management in agriculture in water-scarce and water-stressed regions would be central to reduce the aggregate demand for water to match the available future supplies.

Irrigation is the artificial application of water to the soil usually for assisting in growing crops. In crop production it is mainly used to replace missing rainfall in periods of drought, but also to protect plants against frost.

#### 1.1. Objectives

- To make an assessment of the Andhra Pradesh Micro Irrigation Project in enhancing the crop productivity.
- To assess the impact of Andhra Pradesh Micro Irrigation Project assistance on economics of crop cultivation of sample farmers.

#### 1.2. Sampling

For effective study of the impact of the programme on beneficiaries, purposive random sampling method was followed. For the collection of respondents views and ideas on the impact of the APMIP, two Gram Panchayats in Ananthapuramu district were selected by taking into account the financial, caste, demographic factors of the beneficiaries. From each selected Gram Panchayat 45 beneficiaries were selected by random sampling technique. So the universe of the sample constitutes 90.

### 2. History of Irrigation Development in India

Vedas, Ancient Indian writers and ancient Indian scriptures have made references to wells, canals, tanks and dams.

These irrigation technologies were in the form of small and minor works, which could be operated by small households to irrigate small patches of land. In the south, perennial irrigation may have begun with construction of the Grand Anicut by the Cholas as early as second century to provide irrigation from the Cauvery River. The entire landscape in the central and southern India is studded with numerous irrigation tanks which have been traced back to many centuries before the beginning of the Christian era. In northern India also there are a number of small canals in the upper valleys of rivers which are very old.

#### 2.1. Irrigation during Medieval India

Ghiyasuddin Tughluq (1220-1250) is credited to be the first ruler who encouraged digging canals. Fruz Tughluq (1351-86) is considered to be the greatest canal builder. Irrigation is said to be one of the major reasons for the growth and expansion of the Vijayanagar Empire in southern India in the fifteenth century. Babur, in his memoirs called 'Baburnamah' gave a vivid description of prevalent modes of irrigation practices in India at that time. <sup>(12)</sup> The Gabar Bunds captured and stored annual runoff from surrounding mountains to be made available to tracts under cultivation. <sup>(29)</sup>

#### Irrigation Development under British Rule

Close to nineteenth century according to sources of irrigation; canals irrigated 45 %, wells 35 %, tanks 15 % and other sources 5 %. Famines of 1897-98 and 1899-1900 necessitated British to appoint first irrigation commission in 1901, especially to report on irrigation as a means of protection against famine in India. As a result of recommendations of first irrigation commission total irrigated area by public and private works increased to 16 Mha in 1921. From the beginning of 19th century to 1921 there was no significant increase in tube well irrigated area. During 1910 to 1950 growth rate of irrigation was estimated at 2.0 % per annum for government canal irrigation, 0.54 % per annum for well irrigation and 0.98 % per annum in respect of irrigation from all sources.

## 2.2. Irrigation Development at Time of Independence

At time of independence net irrigated area of India under British rule which include Bangladesh and Pakistan was 28.2 Mha. After partition net irrigated area in India and Pakistan being 19.4 Mha and 8.8 Mha respectively.

## 2.3. Plan Development

Under the Irrigation Component of Bharat Nirman, the target of creation of additional irrigation potential of 1 crore hectare in 4 years (2005-06 to 2008-09) is planned to be met largely through expeditious completion of identified ongoing major and medium irrigation projects. Irrigation potential of 42 lakh hectare is planned to be created by expeditiously completing such ongoing major and medium projects.

## 2.4. Micro Irrigation

Various options are available for reducing water demand in agriculture. First, the supply-side management practices include watershed development and water resource development through major, medium and minor irrigation projects. The second is through the demand management practices which include improved water management technologies/practices. The micro irrigation (MI) technologies such as drip and sprinkler are the key interventions in water saving and improving crop productivity. Evidence shows that up to 40% to 80% of water can be saved and water use efficiency (WUE) can be enhanced up to 100% in a properly designed and managed micro irrigation system compared to 30-40% under conventional practice. The successful adoption of micro irrigation requires, in addition to technical and economic efficiency, two additional preconditions, viz, technical knowledge about the technologies and accessibility of technologies through institutional support systems.

## 2.5. Andhra Pradesh Micro Irrigation Project

Andhra Pradesh Micro Irrigation Project (APMIP) functioning under Horticulture Department is a unique and comprehensive project dedicated completely to Micro Irrigation. The APMIP was started during November, 2003 with the objective of "Encouraging crop productivity by improving water use efficiency". The other objectives of the project being:

### 2.5.1. Objectives

- Increased crop productivity
- Improved quality of agriculture produce.
- Conservation of water and sustainable use of water.
- Higher energy efficiency in agriculture sector.
- Higher fertilizer use efficiency and saving in fertilizer.
- Savings on power consumption.
- Saving in labour expenses.

To empower the farmers with improved technological packages including new growing methods, irrigator fertigation and crop management practices to overcome unpredictable agricultural diverse conditions.

### 2.5.2. The salient features of APMIP are

- First Project on Microirrigation in India.
- Use of only BIS certified products.

- Use of fertigation equipment.
- Operation & Maintenance by MI companies for 5 years.
- Penalties to MI supplier for violations.

### 2.5.3. Types of MI Systems

APMIP arranges the following Micro Irrigation systems to farmers with government subsidy (SC/ST: 100% subsidy) (others: 90% / 75% / 60%).

- Drip (Inline & Online)
- Semi-Permanent Sprinklers
- Rain Guns
- Micro Jets

### Special benefits proposed by Government and banks (Apart from subsidy)

- Cost of MI system reduced through fair and effective negotiations.
- Payment of 5% VAT by APMIP on behalf of the beneficiary farmer.

### Systems provided

- Drip – Online, Inline & Micro Jets for oil palm
- Sprinkler - Semi permanent sprinkler system

### 2.5.4. Selection of beneficiaries

All eligible farmers are selected through Gram sabha. Special teams constituted comprising the officers of APMIP, Horticulture, Agriculture, Sericulture, Sugar Departments and representatives of MI companies and Bankers, visit all potential villages and sensitize the farmers. The teams conduct a detailed village wise survey while involving the Panchayathraj institutions and prepare a list of eligible farmers along with details of land holding, crop being grown / to be grown, estimated cost of the Micro irrigation system, etc. The final list of beneficiaries will be approved in the Gram sabha.

### 2.5.5. Training and Capacity building

Appropriate communication strategies coupled with exposure visits undertaken to the farmers at field level would make the farmers accept Microirrigation as means to achieve higher productivity by increasing water use efficiency. The systematic trainings are undertaken involving PFDCs, KVKs, RARIs, CIPET, ESCI, CRIDA, AFC, CEE, etc. Training methodology includes off farm: Lecture, FGDs, Open discussions using Flip Charts, Video films, etc. During 2006-07 about one-lakh farmers were trained.

### 2.5.6. Progress of the project from inception

From 3-11-2003 to 31-03-2013 a total area 9.75. lakh ha., has been covered with Micro irrigation system in all 22 districts of Andhra Pradesh. Among them 6.94 lakh hectares is under drip method and 2.81 lakh hectares is under sprinkler irrigation. During the 8 years of study the physical achievement under drip irrigation is higher than sprinkler irrigation.

**Table 1**  
**Physical and Financial Progress Achieved under APMIP in Andhra Pradesh**

S. No	Period	Physical Achievement (Area in ha)			Financial Achievement (Rs. in Crores)				No. of farmers covered
		Drip	Sprinkler	Total	State	Govt	Benef. Contri	Total	
1	2003-06	80496	85790	166286	200.63	9.34	210.1	420.04	121451
2	2006-07	66258	23750	90008	91.13	112.77	123.8	327.7	63618
3	2007-08	90000	30000	120000	158.94	145.59	101.5	405.98	93140
4	2008-09	95641	36202	131843	166.88	154.08	85.32	406.28	114027
5	2009-10	108311	38472	146783	381.31	245.04	66.24	692.59	167846

6	2010-11	91345	38340	129685	309.58	173.25	49.14	531.97	137549
7	2011-12	81857	28206	110063	318.27	296.63	61.13	676.03	123773
8	2012-13	80529	237	80766	312	298.93	60.36	671.29	85760
Total		694437	280997	975434	1938.7	1435.6	757.5	4131.9	907164

Source: Records of Andhra Pradesh Micro Irrigation Project, Hyderabad

With regard to financial achievement the share of State Government ranges between 27.81 per cent to 58.20 per cent. During the financial years of 2009-2010 and 2010-2011 the share State government more than half of the total financial achievement. During 2003-06 the beneficiary contribution in overall financial achievement 50 per cent. From 2006-2007 the share of beneficiary contribution is gradually decreasing. On the other hand the share of Government of India is gradually increasing with minor variations. By 2012-2013 the beneficiary contribution stood at 8.99 per cent of total financial achievement.

### 2.5.7. Year wise No. of beneficiaries covered

The particulars with regard to social category wise coverage of beneficiaries under APMIP scheme is presented in table 2.

**Table 2**  
**Table Coverage of Beneficiaries under APMIP**

Year	Number of Farmers Covered under the Scheme				
	Total	SC	ST	Others	Women
2003-04	17432	1569	882	14981	0
2004-05	46894	1266	1158	44470	0
2005-06	57125	7352	5426	35907	8440
2006-07	63618	4424	4522	44133	10539
2007-08	93140	5579	5400	63439	18722
2008-09	114027	7233	6221	82426	18147
2009-10	167846	16597	9771	115601	25877
2010-11	137549	22185	13078	78760	23526
2011-12	123773	20852	12499	70134	20288
2012-13	85760	19465	9405	44111	12779
Total	907164	106522	68362	593962	138318

Source: Records of Andhra Pradesh Micro Irrigation Project, Hyderabad

Table 2 shows that large number beneficiaries of APMIP hail from other category. The share of other category beneficiaries is 94.83 per cent in 2004-2005. From 2008-2009 onwards the share of Scheduled Caste beneficiaries under APMIP is gradually increasing. In 2008-2009 the share of SC beneficiaries among total beneficiaries is 6.34 per

cent and it increased to 22.70 per cent by 2012-2013. In the same way the share of Scheduled Tribe beneficiaries increased from 2008-09 onwards. During this same period their share increased from 5.82 to 10.97. there are no women beneficiaries during the first two years after launching APMIP. The share of women beneficiaries is 20.10 per cent in 2007-08, which is highest of 10 years of study.

## 3. Results and Discussion

### 3.1. Social Category

There is no caste bar to get the fruits of APMIP as per the guidelines of Andhra Pradesh Government. The beneficiaries under the scheme came from all social categories in varying proportions. As the most of the downtrodden sections of rural society are either poor and lower middle class, large number of beneficiaries hail from the Scheduled Castes, Scheduled Tribes and Backward Castes. The percentage of Scheduled Tribes appears less than other social categories, as their population is very low in the sample villages.

It is evident from the table 3 that about 44.44 per cent of sample respondents hail from the BCs, followed by 30 per cent from SCs. It means that nearly three fourths of respondents hail from these two communities. The remaining one-fourth of the respondents hail from STs and FCs. To be precise, the Scheduled Tribes constitute 12.23 per cent and others constitute 13.33 per cent of the sample respondents.

**Table -3**  
**Social Background of the Respondents**

S. No.	Social Background	No. of Respondents				
		SC	ST	BC	OC	Total
1.	Caste category	27	11	40	12	90
		(30.00)	(12.23)	(44.44)	(13.33)	
2.	Religion	Hindu	Muslim	Christian	Others	90
		73	12	5	-	
3.	Sex	(81.11)	(13.33)	(5.55)	-	(100.00)
		Male	Female			
4.	Marital Status	49	41			90
		(54.44)	(45.55)			
5.	Age Group	Married	Unmarried	Widow	Divorced	90
		65	16	4	3	
6.	Age Group	(74.44)	(17.78)	(4.45)	(3.33)	(100.00)
		15-18	19-25	26-40	41 and above	
7.	Age Group	17	31	32	10	90
		(18.88)	(34.44)	(35.56)	(11.12)	

Source: Field Survey

### 3.2. Religion of Sample Respondents

The beneficiaries of APMIP came from various religious backgrounds. Table 3 indicates that largest proportion (81%) of respondents hail from Hindu religion. The second largest religious group, which is benefiting under the programme after Hindus, is Muslims; they constitute 13.33 per cent of total respondents. The Christians constitute about 5.55 per cent of the sample respondents.

### 3.3. Sex Composition of Sample Respondents

It is clear from table 3 that men constitute 54.44 per cent of sample respondents, and males the rest.

### 3.4. Marital Status of Sample Respondents

Most of the sample beneficiaries (74.44%) were married with living life partners. About 7.78 per cent were single because of widowhood or divorce, while another 17.78 per cent were single because of being unmarried.

### 3.5. Age particulars of Sample Respondents

A look at the age of sample beneficiaries belonging to different social categories revealed that nearly 70 per cent of them belong to productive age groups of either 18-25 years or 26-40 years. To be more precise, about 35.56 per cent hailed from age group of 26-40 years, while 34.44 per cent hailed from 18-25 years. About 18.38 per cent hailed from teenage group of 15-18 years. Only 11.11 per cent were aged above 40 years.

### 3.6. Landholding Size

A large majority of beneficiaries of APMIP came from poor backgrounds, owning no land or very little land. Table 4 gives the landholding particulars of sample beneficiaries.

**Table – 4**  
**Landholding Size of Sample Respondents**

S. No.	Landholding size	No. of Respondents	Percentage
1.	Less than 2.5 acres	63	70.00
2.	2.5 acres to 5 acres	21	23.33
3.	5 acres to 10 acres	4	4.44
4.	Above 10 acres	2	2.23
	Total	90	100.00

Source: Field Survey

Table 4 makes it clear that 70 per cent of sample respondents were marginal farmers. They are followed by small farmers with 23.33 per cent. The share of medium and big farmers stood at 4.44 per cent and 2.23 per cent respectively.

### 3.7. Impact on Savings in Cost of Cultivation

The main motive behind the introduction of APMIP is to reduce the cost of cultivation to farmers. Table 5 gives the responses of sample respondent farmers on the impact of APMIP on cost of cultivation.

**Table – 5**  
**Impact of APMIP on Reduction of Cost of Cultivation**

S. No	Type of Change	No. of Respondents	Percentage
1	No Change	58	64.44
2	Increased	9	10.00
3	Don't Know	23	25.56
	Total	90	100.00

Source: Field Survey

Table 5 makes it clear that nearly 64.5 per cent of respondents reported *status quo* with regard to reduction of cost of cultivation as a consequence of APMIP assistance. Only 10 per cent reported a positive change. It is impor-

tant to note that more than one-fourth of the respondents reported neither positive nor negative impact; they have no proper idea on cost of cultivation.

### 3.8. Impact on Yield improvement

Under the micro irrigation scheme water directly reaches to the roots of plants. As such it is expected to improve the yields per hectare to beneficiary farmer. The perception of sample respondent farmers on the impact of APMIP on crop yielding is presented in table 6.

**Table – 6**  
**Impact of APMIP on Water Saving**

S.No	Type of Change	No. of Respondents	Percentage
1	Increased	71	78.89
2	Decreased	-	0
3	Don't Know	19	21.11
	Total	90	100.00

Source: Field Survey

Table 6 indicates that 78.89 per cent of respondents confirmed that there is a real increase in water saving as a result of adopting APMIP. However, about 21.11 per cent of the respondents expressed neither negative nor positive impact of the programme on their income levels.

### 3.9. Water saving

The impact of APMIP assistance on water saving as per the reports of sample farmers is given in table 7.

**Table – 7**  
**Impact of APMIP on Power Saving**

S. No	Type of Change	No. of Respondents	Percentage
1	Increased	61	67.78
2	Decreased	16	17.78
3	Don't Know	13	14.14
	Total	90	100.00

Source: Field Survey

A glance at table 6 makes it clear that 67.78 per cent of respondents reported a increase in the water savings after adopting APMIP techniques. It is quite astonishing to note that nearly 17.78 per cent reported negative impact of APMIP on water saving. They reported that the frequent leakages of drip pipes resulting in loss of water. About 14.44 did not respond to this question.

### 4. Conclusion

The ongoing AP Micro Irrigation Project has created a lot of awareness about importance of irrigation water and need of microirrigation. The project has so far brought more than 9.75 lakh ha of area under micro irrigation. Large-scale implementation of such projects will lead to saving of precious water resources, saving energy and improving the productivity.

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