



RESEARCH ARTICLE

CLIMATE, RAINFALL AND DROUGHT: A STUDY OF ANDHRA PRADESH

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ABSTRACT

Indian agriculture has, for centuries, been solely dependent on the weather and the vagaries of the monsoon in particular. Uncertainties of weather and climate pose a major threat to food security of the country. Extreme weather events like heavy rains, cyclone, hail storm, dry spells, drought, heat wave, cold wave and frost causes considerable loss in crop production every year. Drought is a complex natural hazard. It is defined as any deficiency of water to satisfy the normal need to agriculture, livestock, industry, or human population. Drought Assessment and monitoring is essential for the agricultural sector to take appropriate mitigation measures. The present study attempts to study on climate, rainfall and drought status in Andhra Pradesh. The state spread over with two distinct geographical regions, Rayalaseema and Coastal Andhra. Andhra Pradesh is an important State in Nation's Food Production. With about 49.38 Million Population, who lives in rural areas mostly, agriculture is the main stay of their livelihood. 50.6 per cent of State's Main workforce is engaged in Agriculture and allied Sectors accounts for 27.30 % of Gross State domestic product (GSDP) at current price. But in recent years, drought and other natural calamities have adversely affected the State's economy and its people. Agriculture continues to be monsoon dependant, primarily on South West Monsoon (SWM) through which State receives 2/3 of its rainfall. The State with 5 chronically drought prone districts (viz., Anantapur, Kadapa, Chittoor, Kurnool, and Prakasam) out of 13 districts.

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INTRODUCTION

Andhra Pradesh is one of the states in India which has historically been most severely affected by drought. The failure of monsoons has had a disastrous affect on the states' sizable agriculture sector and a large share of the population dependent on agriculture for livelihood. Drought sets off a vicious cycle of socio-economic impacts beginning with crop yield failure, unemployment, erosion of assets, decrease in income, worsening of living conditions, poor nutrition and, subsequently, decreased risk absorptive capacity; thus, increasing vulnerability of the poor to another drought and other shocks. The study highlights the importance of intensifying efforts to support economic and social development of drought-prone areas that is sustainable and resilient to water-scarce conditions in the long-term. Frequent drought is a difficult fact of life for farmers in the rain-shadow districts of Andhra Pradesh.

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The impact of drought on the overall state economy, the agricultural sector returns is declining. Underlying structural changes in the AP economy are the key reason for this effect. As this is most likely to continue, the Agro- Economic impact of drought will further diminish.

Objectives

The following are the specific objectives of the present study:

- To analyse the status of climate, rainfall and drought
- To study the drought affected mandals by the year wise
- To study the agro- economic profile of andhra pradesh

Profile of the Study area

The State covers an area of 160,204 square KMs accounting for 4.87 percent of total area in the country, Coastal Andhra 92,906 Sq KMs (58 percent of State area) and Rayalaseema covering an area of 67,298 Sq KMs (42 percent of State area). As per Census – 2011, total population of the state is 493.8 Lakhs, of which population in Coastal Andhra 341.9 Lakhs (69.2 percent of total population) and Rayalaseema Region 151.85 Lakhs (30.8 percent of total Population). Population of

Scheduled Castes is 17.1 percent of total Population and population of Scheduled Tribes is 5.3 percent of total population. In Andhra Pradesh, Agriculture Work Force is 50.6 percent of total work force as per Population Census –2011. Irrigated area was 40.96 lakh hectares (50.39 percent of sown area), which includes area under canals (19.56 lakh ha), Tanks (3.77 lakh ha), tube wells (15.07 lakh ha), and other wells (1.16 lakh ha) and area under other sources is 1.40 lakh hectares. Un-irrigated was 40.32 lakh hectares in 2013-14 by Agricultural Census.

Agro- Economic features of Andhra Pradesh:

Agriculture which is mostly rain fed has been the main livelihood occupation of the farmers in the State. The area under food grain during 2012-13 was 41.56 Lakh hectares. Food grain production was 104.96 Lakh tones in 2012-13. Cereals and Millets contribute to the food grain production (83.21%) followed by pulses (10.79%). About the population of A.P. lives in rural areas and depends for its livelihood on agriculture and the rural non-farm sector. Andhra Pradesh ranks first at all India level in the production of Mango, Chillies, Turmeric, Sweet Lime and Papaya. The state also ranks second in the production of Lime, Coriander, Pomegranate, Loose Flowers; 3rd rank in cashew; 4th in Sapota and 5th in Banana, Guava and Ginger. The major crops include rice, Bajra, jowar, groundnut, sunflower, sugarcane, pulses, cotton, chillies, turmeric, and horticultural crops like mango, banana and citrus. Significant changes have also taken place in cropping pattern in Andhra Pradesh. The share of rice, millets and groundnut decreased while the share of maize, pulses and cotton crops has increased in the nineties. Although share of rice in terms of net sown area has decreased, the overall production of rice was compensated by increase in the yield. Rice is a major crop in the State followed by millets, pulses and non –food crops like oilseeds, Cotton, Tobacco, and Jute, Dyes, fodder crops and green manure crops.

Table 1. Andhra Pradesh Agricultural profile

S. No	Category	Area in Hectares (Lakh)	
		Total	
1	Total Geographical Area	162.4	
2	Gross Cropped Area	79.60	
3	Net Cropped Area	63.54	
4	Gross Irrigated Area	37.11	
5	Net irrigated Area	28.01	
6	Number of Farm Holdings	76.21	
	i) Marginal	49.83	
	ii) Small	15.91	
	iii) Others	10.47	
7	Total area operated by	80.96	
	i) Marginal	21.60	
	ii) Small	22.51	
	iii) Others	36.85	
8	Average Annual Rainfall	966.1	
9	Cropping Intensity	1.23 (%)	
10	Irrigation Intensity	1.32 (%)	

Source: Department of Agriculture- Government of Andhra Pradesh, 2014-15

Place of Agriculture in Andhra Pradesh Economy

Andhra Pradesh is the eighth largest state in the country covering 162.44 lakh hectares and representing 5.01 per cent of the country's area.

It has a population of 4.94 crores, ranking tenth in the country. Sustainable growth in Agriculture sector is the “need of the hour” not only for the State of Andhra Pradesh but also for the Country as a whole. It is the bed rock of the State's economy. Out of the total population of the State about 70 per cent live in rural areas eking their livelihood from Agriculture and allied activities. It is a major source of income to the State's economy. Agriculture is the back bone of state's economy contributing about 23 per cent to the Gross Domestic Product of the State. Andhra Pradesh is one of the progressive States in respect of agriculture development, maintaining high levels of crop production.

Climate and Rainfall

Diversified climatic conditions prevail as per the changing seasons. Piercing sun heat in summer followed by opening of sluice gates of sky, for which agriculturists anxiously await, paving a path for pleasant winter, prevail in perpetual periods in Andhra Pradesh. The state has generally a hot summer and a pleasant winter. The state has arid, semi-arid and sub-humid climatic conditions. The maximum and minimum temperatures in the state are 41.5°C and 11.1°C respectively. The rainfall in Andhra Pradesh is influenced by both South-West and North-East Monsoons.

The normal annual rainfall of the State is 940 mm. Major portion (68.5%) of rainfall is contributed by South-West Monsoon (June-Sept) followed by (22.3%), North-East Monsoon (Oct-Dec). The rest 9.2% of the rainfall is received during the winter and summer months. The distribution of rainfall is erratic, resulting in frequent droughts. Coastal Andhra receives rains mainly through south-west monsoon (80%), while Rayalaseema to a large extent during the north-east monsoon. In Andhra Pradesh about 50% of the area falls under dry land agriculture and rest is irrigated.

The total cultivated area is 8.6 m ha and this is spread over various agro-climatic regions of the state. Rainfall received during the South-West Monsoon period for 2014-15 was 374 mm as against the Normal rainfall of 554 mm, recording a deficit by 32%. The rainfall received during the North East monsoon period for 2014-15 was 173 mm as against the normal rainfall of 298 mm, recording a deficit of 42%. The state (13 Districts) as a whole received 43 mm rainfall against the normal rainfall of 93 mm (54 per cent deficit) during June-2014. The details of the average rainfall and normal rainfall are given below Table 1 & 3.

Status of Droughts in Andhra Pradesh (1995-96 to 2014-15)

Drought is a complex and challenging natural phenomenon. It is an even more complex and challenging socio-economic phenomenon, with diverse, sometimes conflicting, impacts on the micro, sectoral and macro levels. State has been affected by 13 natural calamities, viz., Laila Cyclone (May 2010), Heavy rains (South-West Monsoon 2010), Jal Cyclone (October-November-2010), Depression (December, 2010), Thane Cyclone (December – 2011), Drought (Kharif 2011), Nilam Cyclone (Oct-Nov-2012), Drought (Kharif-2012), Unseasonal Heavy Rains (Feb-2013), Phailin Cyclone (October- 2013), Heavy Rains / floods (October-2013),

Table 2. Region wise average rainfall during 2014-15 (During June- 2014)

S.NO	Region	Average Rainfall June-2014 (mm)	Normal Rainfall June-2014(mm)	Percentage deviation from normal (%)
1	Coastal Andhra	36	103	-65
2	Rayalaseema	59	72	-18
	Andhra Pradesh	43	93	-54

Source: Director, Economics and Statistics, Hyderabad.

Table 3. Rainfall deviation in the districts during 2014-15 (During June-2014)

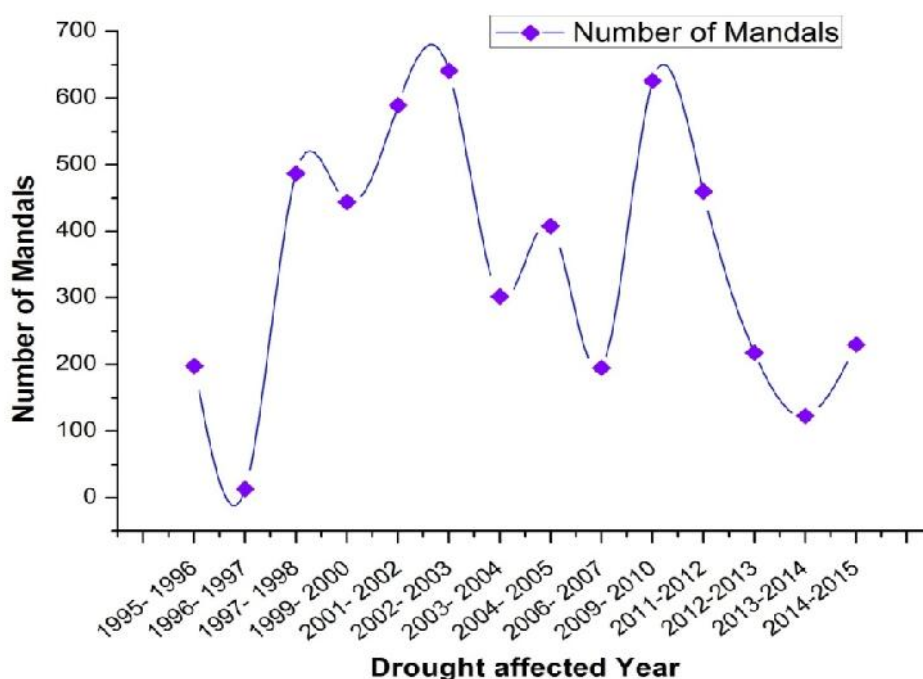
S. No	Deviation	Districts	Number of Districts
1	Excess (20% & above)	NIL	-
2	Normal (+19% to -19%)	Kurnool (-7) and Chittoor (-14)	2
3	Deficit (-20% to -59%)	Anantapur (-21%), Kadapa (-33%), Nellore (-41%), Vijayanagaram (-45%), Srikakulam (-50%) and Visakhapatnam (-58%)	6
4	Scanty (-60% to -99%)	Krishna (-71), Prakasam (-79%), East Godavari (-80%), West Godavari (-81%) and Guntur (-85%)	5

Source: Directorate, Economics and Statistics, Hyderabad.

Table 4. Total number of mandals affected by the drought

S. No	Drought affected Year	Number of Mandals
1	1995- 1996	198
2	1996- 1997	13
3	1997- 1998	487
4	1999- 2000	444
5	2001- 2002	589
6	2002- 2003	641
7	2003- 2004	302
8	2004- 2005	408
9	2006- 2007	195
10	2009- 2010	626
11	2011-2012	460
12	2012-2013	218
13	2013-2014	123
14	2014-2015	230

Source: Memorandum of Drought in Andhra Pradesh- 2014.

**Fig. 1. Trends in drought affected Mandals in Andhra Pradesh (1995- 96 to 2014-15)**

Helen Cyclone (November-2013) and Leher Cyclone (November-2013) affecting the livelihood of many families. During current year, the State experienced unprecedented loss in 4 North Coastal District due to Very Severe Cyclone "HUDHUD" Cyclone in October-2014. Five out of the 13 Districts in Andhra Pradesh were included in the list of Districts chronically affected by Drought conditions, i.e., Anantapur, Chittoor, Kadapa, Kurnool and Prakasam Districts. Since 1995, the State has witnessed Drought in 15 years out of 19 years. Number of Mandals declared as drought affected in each of these years were mentioned below Table 4.

Conclusion

Social and economic life of Andhra Pradesh population is characterized by recurring natural disasters. The state is exposed to cyclones, storm surges, floods, and droughts. According to the available disaster inventories, Andhra Pradesh is the state that has suffered the most from the adverse effects of severe cyclones. Though the Andhra Pradesh is identified as the "beje welled rice bowl of India". Drought is severely caused the labour displacement i.e., Migration.

Government of Andhra Pradesh has declared 230 Mandals as drought affected Mandals in the year 2014-15. It is therefore, necessary for the State Government to immediately start relief employment programs and provide works. Provision of employment is an important drought mitigation measure in the State. Income generation through the employment works helps the poor labourers to meet their basic needs such as food and health expenditure.

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