ORIGINAL RESEARCH PAPER

Economics

ROLE OF IRRIGATION IN CROPPING PATTERN A CASE OF KADAPA YSR DISTRICT OF ANDHRA PARADESH

KEY WORDS: cropping pattern, irrigation, drought

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1.0.Introduction

According to Krishna Bharadwaj (1990), "While considerable literature on irrigation deals with the technical \engineering aspects of different modes of irrigation ,economic analysis has mainly focused on the contribution that irrigation makes to output growth and agricultural productivity". India is a tropical country where agriculture is dependent mainly on eratic monsoon . The government of India has been there spending crores of rupees to reduce its dependence on rain by creating irrigation facility in the country through developing major and minor projects. Eventhough, due to scaricity of rainfall over the regions farmers are choosing cropping pattern in India.

Cropping pattern means both the time and space sequence of crops. It includes the identification of the most efficient crops of the region which is considered a homogeneous soil and climatic belt; the rotation in which the crop fits in and the intensity of cropping **(Kanwari J.S, 1972).** Factors like socio-economic conditions of farmers, cultural factors, climatic conditions, etc. determine or influence the cropping pattern in a region.

The fundamental reason for cropping pattern differ over regions is that the amount of rainfall received varies widely from place to place. Based on the average amount of rainfall received in a season, the cultivated area in the country is broadly classified into three categories viz. (i) area receiving rainfall above 1150 milli meter (mm), (ii) area receiving rainfall within the range of 750-1150 mm and (iii) area where rainfall is below 750 mm. Most areas of Assam, Kerala, Orissa and West Bengal come under the first group. The major crop grown in these areas is rice. The states of T.N., U.P. and Andhra Pradesh are the second category. These areas provide ample potential for setting up minor and major irrigation facilities. Under the third category, which offer little scope for improving cropping intensity due to relatively less rainfall, include parts of A. P., Karnataka, Maharashtra and Rajasthan.

1.1.Types of Cropping Pattern:

a. Mono-cropping and Multiple-cropping:
If a single crop is grown on a piece of land year after year it is refereed to as monoculture or ***mono-cropping***. Multiple-cropping therefore implies intensification of cropping in time and space dimension i.e. more crops at one time and more crops on same amount of land at any given period.

b. Inter-cropping:
Inter-cropping refers to growing more than one crop simultaneously on a single piece of land with a definite row pattern. The practice can be followed with a certain defined ratio like 5 : 1 in which after every five rows of a particular crop the sixth row would be of a different crop.

c. Mixed-cropping:
Mixed-cropping refers to growing two or more crops simultaneously without any definite row pattern. This practice is most commonly followed in dry land tracts. Under this system, seeds of different crops are mixed in certain proportion and sown. The objective is to meet family requirement of cereals, pulses and vegetables.

d. Sequence-cropping:
The Sequence-cropping refers to growing more than one crop in a sequence on the same piece of land in a farming year. Depending on the number of crops grown, the system may be called as double, triple, quadruple cropping pattern for crops involving two, three and four crops respectively.

e. Relay/Ratoon-cropping:
Ratoon-cropping (or ratooning) refers to raising a crop with re-growth coming out of roots or stalks of previously harvested crop.

f. Integrated Farming System:
This refers to following different types of cropping systems besides pursuing other allied areas of animal husbandry like dairying, poultry, fishery, bee-keeping, etc.

1.2.Objectives:

i. to study the Cropping pattern in droought prone areas
ii. to analyse the role of irrigation on Cropping Pattern

1.3. Methodology:

The present study is based on the secondary data drawn from the issues of Statistical Abstracts of Andhra Pradesh, published by Bureau of Economics and Statistics, Government of Andhra Pradesh,Chief Planning Office Kadapa YSR District and District Hand Book . Some data were also drawn from the Statistical Abstracts of India, published by the Central Statistical Organization, Ministry of Statistics and Programme Implementation, Government of India.

1.4. Cropping pattern in Andhra Pradesh:

Andhra Pradesh is the tenth largest state in the Country, in terms of population. According 2011 Census, the State accounts for 4.10 per cent of the total population of the country. The population of Andhra Pradesh is more than doubled in the last half century from 23.29 million in 1961 to 49.58 million in 2011. Of this, 24.83 million are males and 24.75 million are females. The density of population for Andhra Pradesh is 304 persons per square kilometer, as against 382 persons per square kilometer at all India level in 2011. With a geographical area of 1, 62,970 sq km, Andhra Pradesh ranks as the 8th largest State in the country. Situated in a tropical region, the state has the 2nd longest coastline in the country with a length of 974 km. The State has a forest area of 36909.36 Sq.Kms, as per the forest records. The sex ratio in the state was up from 983 in 2001 to 997 in 2011 and is higher than all India figures of 943 in 2011. The literacy rate of the State is 67.35 percent in 2011 as against 62.07 percent in 2001.

Andhra Pradesh is a river state and irrigation projects are "poems in concrete", as late Sonti Ramamurthy put it. Irrigation being a critical input to agricultural production, the predominating agriculture-oritented state of Andhra Pradesh, therefore received prime attention and lion's share of budget was allotted to building up of irrigation projects.

The principal projects providing irrigation are the new barrages to replace the old anicuts on the rivers Godavari, Krishna, Tungabhadra and the Penna and the new dams/reservoirs and canal systems of Nagarjuna Sagar, Tungabhadra high and low level canals, Sriramsagar, Somasila, Vamsadhra etc.. The State of Andhra Pradesh is allocated 512.040 TMC of Krishna Waters under the existing Projects. The existing utilization under Godavari is to the extent of 308.703 TMC.

Creation of Irrigation Potential continued to be the most prioritized area. So far 103.50 lakh acres of irrigation potential has been created up to Nov 2016 under major anicuts on Krishna, Godavari and Pennar rivers, Projects like NagarjunaSagar, Telugu Ganga, Somasila, SRBC, Vamsadhara, Medium Irrigation projects and Minor Irrigation schemes **(Scocio-Economic Survey 2016-17).**

1.5. Role of Irrigation on Cropping Pattern in Kadapa:

The total Geographical area of the District is 15,379 Sq.Kms. with 3 Revenue Divisions, 51 mandals, 790 Gram Panchayats, 972 Revenue Villages and 4954 Habitations. According to the 2011 Census the population of the District is 2882469 of which the Rural Population is 1903337 and the Urban Population is 979132. The total geographical area of Y.S.R. District is 15,35,900 hectares, total cropped area is 3,96,864 hectares and net area sown is 3,40,271 hectares and area sown more than once is 23,959 hectares during the year 2015-16.

The year divided into four seasons. The period from December to February is the dry and comparatively cool season. The summer seasons starts from March and lasts till May. May is the hottest month of the year. This is followed by the south-west monsoon from June to September, October and December constitute the post monsoon or North East monsoon season.

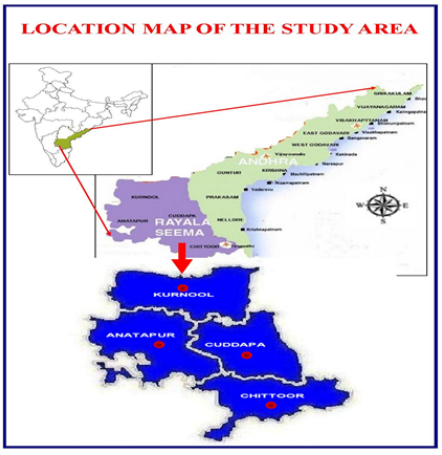

Fig No: 1.5.1 (a) Location Map of Rayalaseema region

The average annual rainfall in the District is 696.6 mm, which is insufficient for cultivation. The rainfall generally increases from the North-West to the South-East in the District. The rainy season starts from June and lasts till November. October is the month with the highest normal rainfall. **The rainfall in South-west monsoon period is most important for the sowings of dry crops in the District which covers 75 per cent of the total cropped area. (District Handbook of Kadapa, 2015-16).**

In Kadapa, most of the people depends on Agriculture . The major crops are Paddy, Groundnut, Sunflower, Cotton, Betel leaves and Horticultural crops like Mango, Papaya, Banana, Lemon and Oranges. The gross cropped area is 3,96,864 hectares, out of this, gross irrigated area is 1,85,292 hectares. The Major Source of Irrigation is under K.C. Cannal. There is a Major Irrigation Project on Penna at Mylavaram. Pincha Project, Lower Sagileru Project, Upper Sagileru Project, Annamay Project, Brahma Sagar Project and Pulivendula Branch Canal are Medium Irrigation Projects in the District.

Rain-fed agriculture faces several constraints such as high spatial variability, dependence on uncertain rain, fewer rainy days, over-exploitation of groundwater, impoverishment of soils and preponderance of the poor in arid and semi-arid terrains. Moreover, climate change is likely to accentuate the problem further.

Kadapa district is said to be the heart of the Rayalaseema as it is centrally located. Rayalaseema region, comprising of Kadapa, Kurnool, Anantapur and Chittoor, lies in the rain shadow zone of Western Ghats. Consequently, this area receives very low rainfall during the South West and the North East monsoons as well. The rainfall of 365.8 mm of the Khariff period in Rayalaseema is still distributed and undependable. It is utterly inadequate even to raise the dry crops like groundnut or jowar.

Table 1.5.2. Sources of Irrigation in KADAPA YSR District (Area in Hectares)

Sources of Irrigation	Kadapa
Canals	22537 (12.3)
Tanks	3892 (2.12)
Tube Wells	153134 (83.6)
Dug Wells	2629 (1.4)
Lift Irigation	857 (0.46)
Other Sources	21 (0.01)
Total	183070 (100)

Source: Chief Planning Office, Kadapa

Table:1.5..3 Crop-wise Area and Yield (Area in Hec, Yield per Hec)

Crops	2009-10		2010-11		2011-12		2012-13		2013-14	
	Area	Yield	Area	Yield	Area	Yield	Area	Yield	Area	Yield
Rice	128194	2650	17037	2870	6606	2649	6601	2916	10959	3450
Jowar	4641	926	4185	1516	7881	333	12887	1446	6578	1284
Groundnut	19013	3145	17296	2992	20188	2395	20395	1567	17263	2620
Bengalgram	77338	493	77338	1105	90366	168	112194	168	97046	97046
Sesamum	6770	333	5763	352	4848	513	4729	572	9201	361
Sunflower	50711	1109	72977	227	60676	632	48021	401	26486	650

Source: Chief Planning Officer, 2014

Rain-fed agriculture faces several constraints such as high spatial variability, dependence on uncertain rain, fewer rainy days, over-exploitation of groundwater, impoverishment of soils and preponderance of the poor in arid and semi-arid terrains. Moreover, climate change is likely to accentuate the problem further. In the State of Andhra Pradesh, around 56 per cent of the net sown area is under rain-fed agriculture. Classifying a district as rain-fed if less than 30 per cent of its net sown area is not under dependable irrigation, the following districts qualify as rain-fed districts: Anantapur, Chittoor, Kadapa, Kurnool, Prakasam, Visakhapatnam and Vizianagaram. Of these, Anantapur is arid, Kadapa and Kurnool are semi-arid, Chittoor and Prakasam are wet semi-arid and Visakhapatnam and Vizianagaram are sub-humid. Droughts occur more frequently in arid, dry and semi-arid districts**.** Pulses are the major crop in the rain-fed as well as in irrigated districts. Groundnut is the predominant crop in the dry areas particularly in the present study area.

Conclusion:

In the Rayalaseema region, Kadapa District, the principal crop was groundnut and the area under groundnutgrew impressive growth followed by Rice, Sunflower, Bengalgram, Jowar, Sesamum . A changed cropping pattern with commercial crops will help in effective' utilisation of irrigation water.

For ensuring a change in the cropping pattern all the ancillary facilities like field distributory system, drainage channel, institutional finance and inputs should be provided within easy reach of the cultivators **(K. William Easte).**

REFERENCES

1. Annual Report (2013-14), Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. Of India, Krishi Bhawan, New Delhi.
2. Chadha G K , S. Sen and H. R. Sharma (2004), Land Resources , State of Indian Farmer: A Millennium Study, Vol. 2, Academic Publishers, New Delhi.
3. Govt. of India (2001), Report of the Working Group on Agricultural Statistics (for the X Five Year Plan), Planning Commission, New Delhi.
4. (http://planningcommission.nic.in/aboutus/committee/wrkgrp/wgagristat.pdf)
5. Kanwari J.S (1972) " Cropping Patterns- Scope and concept", Proceedings of the Seminar on cropping pattern in India, I.C. A.R., 1972, pp.13-15.
6. Rajiv Ranjan Shrivastava (2007), Emerging Trends of Cropping Pattern in India, DK Publishers, New Delhi.
7. K. William Easter (1974), "Neglected Opportunities in Irrigation", Eco. 8 Pol. Weekly, Vol.X No. 14, April, 6, 1974, PP. 557 - 564.