

A Study of Crop Combinations in Chittoor District of Andhra Pradesh

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Abstract

Agriculture plays a vital role in the Indian economy. It is an important sector as it contributes about 17% to the total GDP and provides employment to over 60% of the population. Field crops, horticultural crops, agro-forestry plants, livestock, fisheries etc., are included in agricultural sector. Arid and semi-arid condition severely affects all these components of agricultural sector. Due to lack or shortage of moisture. Proper cropping system and cropping pattern promotes food security in any region especially in the drought prone areas. India being a second most populous country, every piece of land must be optimally utilized, as land is fixed and limited compared to the population. Though the Green revolution enhanced the food grain production, the sustainability of land quality, its environment and recurring hazards and disasters posed a problem to the farmers, policy makers and planners. Cropping system comprises all components required for the production of a particular crop and the interrelationships between them and environment. In the cropping systems, sometimes a number of crops are grown together or they are grown separately at short intervals in the same field. The study of crop combination brings out a comprehensive scenario to understand the cropping system of any area. Hence in the present article an attempt is made to study the Crop combinations in Chittoor District of Andhra Pradesh using Doi's method.

Introduction:

Crop combination is a process of cultivating or growing multiple crops in the same field. This practice helps farmers to harvest more than one crop in different seasons from the same piece of land. Due to a variety of crops in the multiple crop combinations, they help to nurture the soil and increase its fertility. The concept is an integral and important part of agricultural geography as it also provides a good basis for agricultural regionalization. The crops are generally grown in combination and it is rarely that a particular crop occupies a position of total isolation with other crops in a given areal unit at a given point of time. The mapping of the integrated assemblage of various crops grown in an aerial unit in the form of crop combinations is more important and comprehensive than the depiction of individual crops in a map. For example, the demarcation of India into the Rice Region or Wheat region does not explain the agriculturally significant fact that very often the wheat region also has a Rice crop and vice versa, or Wheat is often grown with Grams Barley or some other crops.

Systematic study of crop combinations is of great significance, for a comprehensive and clear understanding of the agricultural mosaic of an agro-climatic region and for the planning and development of its agriculture, in recent years the concept of crop combination has engaged the attention of geographers and agricultural

land use planners. Hence, in the present research article, an endeavor is made to study the quantitative analysis of crop combinations in Chittoor District. The district being in semi-arid climatic zone, planning of crop land matters a lot and the present study throws a light in this direction.

Study Area:

Chittoor district lies in the southernmost part of Andhra Pradesh. It forms a part of the semi-arid as well as backward Rayalaseema region. Geographically, it is located between 12° 37' and 14° 8' Northern latitudes and between 78° 33' and 79° 55'. Eastern longitudes. It is bounded by Karnataka in the west, Tamilndnu in south and south east, Nellore district in east and northeast, Kadapa district in north and Anantapur district in north western part. The total geographical area of Chittoor district is 15,152 sq.kms. It is the fifth largest district both in terms of area (5.51%) and population (8.44%) in Andhra Pradesh State. Administratively, the district is divided into three revenue divisions and 66 mandals.

Objectives:

- To identify the crop combinations for the two time period i.e., 2007-08 and 2018-19.
- To study the changes in crop combinations during 13 years period.

Database and Methodology:

In the present study, secondary data pertaining to General cropping pattern for two time periods i.e., 2007-08 and 2018-19 have been collected from the Government records and reports from Chief planning officer, Hand book of Statistics, Agricultural Department of Chittoor District taking 'Mandal' as Unit. Simple statistical techniques such as percentages and averages have been used to analyse the data. Doi's method has been employed to find out various crop combinations in the district.

Results and Discussions:

By employing Doi's method, the crop combinations are identified in the district for the study period 2007-08 and 2018-19. Broadly speaking, the following crops namely Fruits & Vegetable crops, Paddy, Groundnut, Sugarcane, Horsegram, Chillies, Greengram, Ragi and Bajra are found at least in one of the crop combinations and hence these crops are considered very significant. The distributional pattern of the combinations revealed that the combinations have been found from mono crop to seven crop combinations in the district. Both in area and number, Mono crop combination such as Groundnut is more prevalent in the district.

Crop Combination (2007-08):

The Crop Combinations are analysed by employing Doi's method in Chittoor District for the study periods 2007-08. The Crops such as Fruits & Vegetable crops, Groundnut, Horsegram, Paddy, Sugarcane, Chillies, Greengram, Ragi and Bajra are crops found in the crop combinations during the study period. The distributional pattern of the

combinations revealed altogether 7 crop combinations in the district. Double and Triple crop combination is more prevalent in Chittoor district both in area and number with 24 and 23 mandals respectively.

Mono Crop Combination:

In about 10 mandals Mono crop combination is observed in the district. Groundnut crop is monopolistic in the mono crop combinations, occupying 9 mandals of the district namely Thambalapalle, Peddamandyam, Kalakada, K.V.Palle, Piler, Kalikiri, Vayalpadu, Kurabalakota and B.Kothakota. Paddy crop registered under mono crop cultivation in only one mandal i.e., in Varadaiahpalem (Fig.1).

Two Crop Combinations:

It is the largest combination in Chittoor District, occupying 24 mandals of the district. In about 11 mandals, Groundnut is the first crop along with Fruits & vegetable crops, under double crop combination. In 5 mandals Paddy + Groundnut, in 2 mandals Paddy +Fruits & vegetable crops are reported under double crop combination. In 5 mandals the double crop combinations are noticed with Fruits& Vegetable crops + Groundnut. Only one mandal S.R.Puram is recorded with Sugarcane + Groundnut Combination (Fig.1).

Three Crop Combinations:

Triple crop combination is also another largest combination in the study area occupying 24 mandals of the district. Groundnut + Sugarcane + Fruits & Vegetables combination is found in 7 mandals, Groundnut + Fruits & Vegetables + Sugarcane is noticed in 6 mandals, Fruits & Vegetables + Groundnut + Sugarcane is reported in 4 mandals, and in the remaining 7 mandals the three crop combination is observed with different crops such as Groundnut, Fruits & Vegetable crops Paddy, Sugarcane, Ragi and Horsegram (Fig .1).

Four Crop Combinations:

During 2007-08 about 4 mandals have been registered under four crop combination with different crops. Groundnut + Sugarcane +Fruits & Vegetables + Paddy is noticed in Narayanavanam, Groundnut + Paddy + Sugarcane + Fruits & Vegetables combination is found in Tirupati rural, Sugarcane +Groundnut + Fruits & Vegetables+ Paddy is reported in Pitchaturmandal and Ragi + Groundnut + Horsegram + Fruits & Vegetable crops combination is recorded in Gudupalle mandal (Fig . 1).

Five Crop Combinations:

Interestingly, not even a single mandal is registered under five crop combination in Chittoor district during the study period.

Six Crop Combinations:

Under six crop combination, only Santhipuram mandal is reported with Fruits & Vegetables + Groundnut + Horesgram + Greengram +Chillies + Sugarcane Crops. No other mandal is reported insix crop combination (Fig.1).

Seven Crop Combinations:

In Chittoor District 3 mandals have been noticed under 7 crop combinations (Fig-1). They are Nindra (Paddy +Sugarcane + Fruits & Vegetable + Bajra + Greengram + Chillies), Vijayapuram (Groundnut + Fruits & Vegetables + Paddy + Sugarcane + Bajra + Chillies + Greengram) and Ramasamudram mandal (Groundnut + Fruits & Vegetables +Sugarcane +Chillies + Ragi + Paddy +Horsegram).

Crop Combinations (2018-19):

In Chittoor District, about six crops namely, Paddy, Groundnut,Fruits & Vegetable Crops, Sugarcane, Horsegram,Bajra have been found in at least one of the crop combinations during the studyperiod 2018-19. It is observed that there are only 4 major combinations starting from Mono crop combination to Four crop combination in the study area. Aereally, Triple crop combination dominated in the district followed by two crop combination.

Mono Crop Combination:

Mono crop combination with different crops is reported in 6 mandals of the district namely, Nindra (Sugarcane), Yerpedu (Paddy), Thottambedu (Paddy), Varadaiahpalem (Paddy), Tirupati Urban (Paddy),Yerravaripalem (Fruits & Vegetables). These mandals are confined in the eastern part of the district (Fig-2).

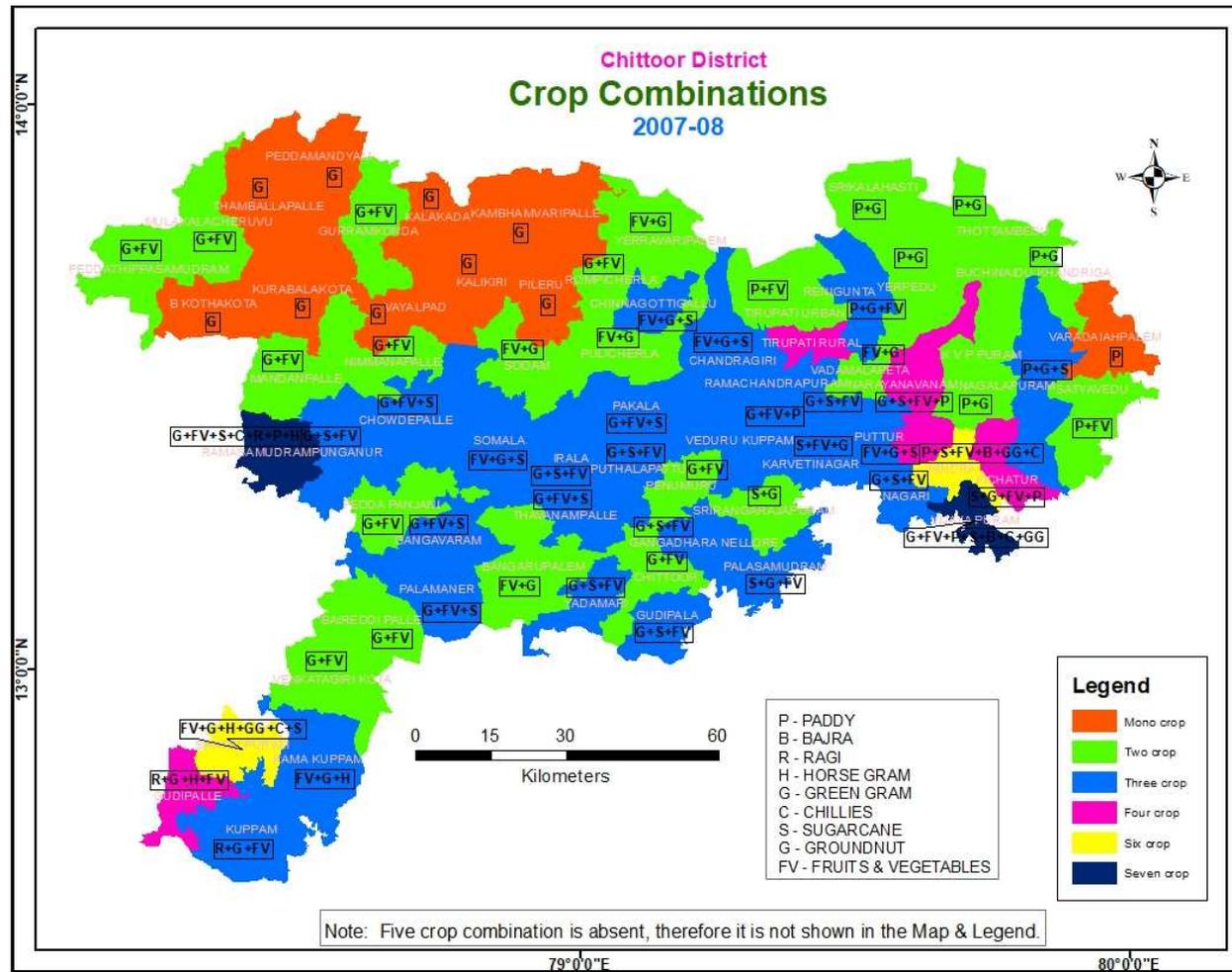


Fig-1

Two Crop Combinations:

This is the second largest crop combination region in the district, which is reported in 23 mandals of the district. Groundnut + Fruits & vegetable crops combination is found in maximum number of mandals i.e., 9 mandals of the district followed by Fruits & vegetable crops + Groundnut combination in 5 mandals, Fruits & vegetable Crops + Sugarcane in 2 mandals, Paddy + Groundnut in 2 mandals, Fruits & vegetable crops + Horsegram in 1 mandal, Sugarcane + Fruits & vegetable Crops in 1 mandal, Sugarcane + Paddy in 1 mandal, Ragi + Horsegram in 1 mandal and Horsegram + Groundnut Combination found in 1 mandal (Fig-2).

Three Crop Combinations:

It is the largest combination in the district during the year 2018-19 occupying 29 mandals with 17 different combinations. Groundnut + Fruits & Vegetables + Horsegram combination is registered in 4 mandals, Fruits & Vegetable crops + Groundnut + Horsegram in 3 mandals, Groundnut + Horsegram + Fruits & Vegetable crops in 3 mandals, Horsegram + Groundnut+ Fruits & Vegetable crops in 3 mandals, Groundnut + Fruits & Vegetables + Sugarcane in 2 mandals, Groundnut + Sugarcane + Fruits & Vegetable crops in 2 mandals, Paddy + Sugarcane + Groundnut Combination in 2 mandals and the remaining 10 combinations have been reported with different crops in each of the mandals (Fig-2).

Four Crop Combinations:

Four crop combinations is the third largest combination during the year 2018-19 in Chittoor District with 8 different combinations in 8 mandals. They are Fruits & Vegetable crops + Sugarcane + Paddy + Groundnut in Ramachandrapuram, Groundnut + Horsegram + Fruits & Vegetable crops+ Sugarcane in Penumuru, Paddy + Fruits & Vegetables + Sugarcane + Horsegram in Tirupati rural, Paddy + Groundnut + Bajra + Fruits & Vegetables in K.V.B Puram, Sugarcane + paddy + Groundnut +Fruits & Vegetables combination in Pichatur mandal, Groundnut + Fruits & Vegetable crops + Horsegram + Paddy in Kurabalakota, Fruits &Vegetable crops + Groundnut + Horsegram + Paddy in Madanapalle, Groundnut + Horsegram + Ragi + Fruits & Vegetable crops combination in Kuppam mandal (Fig-2).In the study area the crop combinations have been confined to only Mono crop, Two Crop, Three Crop and Four Crop combinations during 2018-19. The other combinations are completely absent (Fig-2).

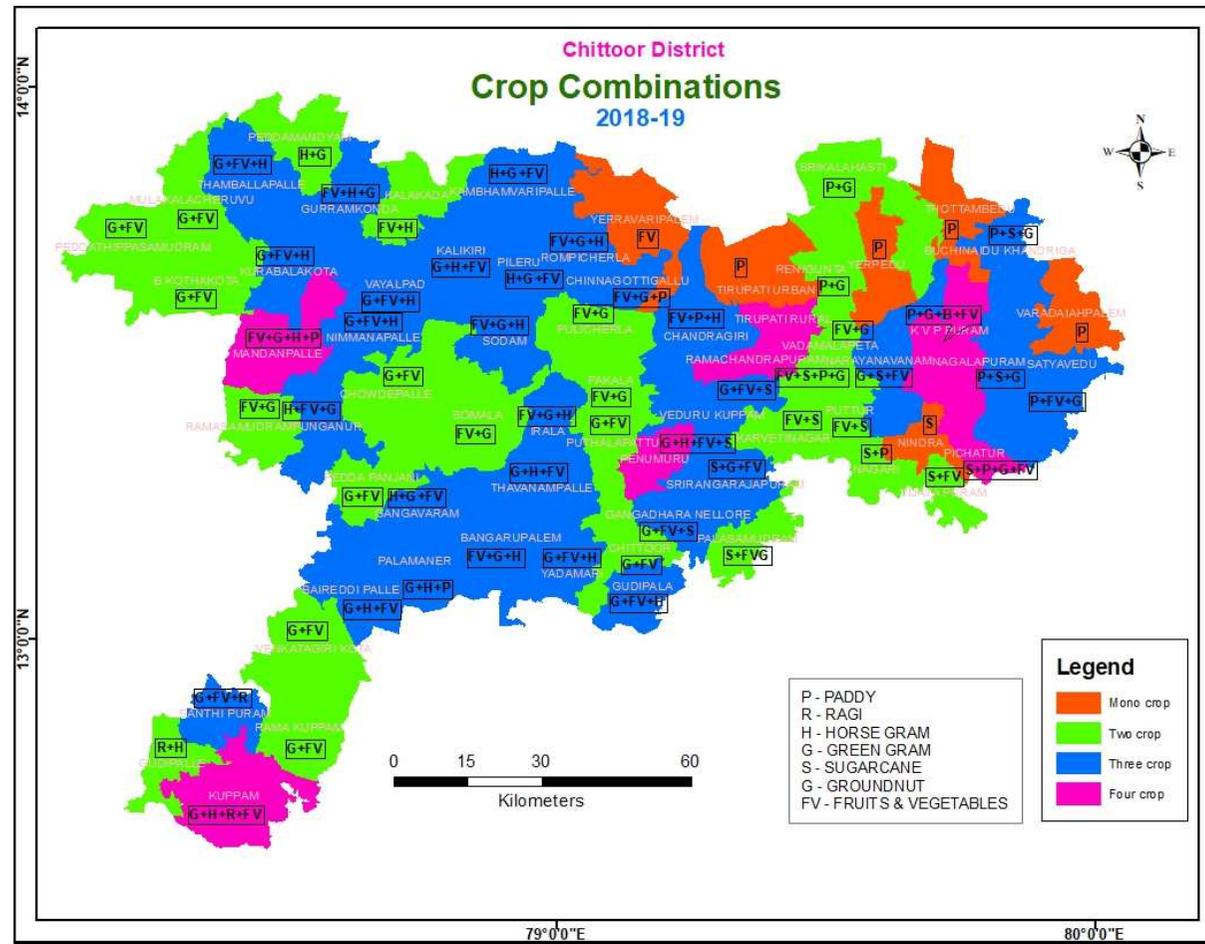


Fig-2

Changes in the Crop Combination (2007-08 and 2018-19):

Significant changes have been noticed in the crop combinations during 13 years period i.e., from 2007-08 to 2018-19 in Chittoor district. Spatially, decrease in the number of mandals has been noticed in Mono crop combination (-4 mandals), Two crop combination (-1 mandal), Six crop combination (-1 mandal) and Seven crop combination (-3 mandals) in the study area, Whereas increase in the number of mandals has been observed in Three crop combination (+6 mandals) and Four crop combination (+3 mandals). The crops in all these combinations differed in some cases and similar in others cases (Fig 1&2). Five crop combination is completely absent during study period 2007-08 and 2018-19 (Table-1), whereas during 2018-19, six crop combination and seven crop combination also disappeared in district.

Table-1
Crop Combinations in Chittoor District
2007-08 & 2018-19

S.No:	Crop Combination	No. of Mandals in each individual Crop Combination		Decrease / Increase in the number of mandals during 13 years period
		2007-08	2018-19	
1	Mono Crop	10	6	-4
2	Two Crop	24	23	-1
3	Triple Crop	24	29	+5
4	Four Crop	4	8	+4
5	Five Crop	-	-	-
6	Six Crop	1	-	-1
7	Seven Crop	3	-	-3

Conclusion:

In Chittoor district, during the year 2007-08, altogether, 7 combinations have been found. Of which double and triple crop combinations are more prevalent aerially. Five crop combinations are absent completely. In all these combinations about 9 crops gained the ground. In the year 2018-19, only four combinations i.e., mono crop, two crop, three crop and four crop combinations have been observed and the rest of the combinations are

not disappeared. Only seven crops formed these combinations in the year 2018-19. It we see the changes during 13 years period decrease in the number of mandals have been reported in mono crop combination, Two crop combination, sex crop combination and seven crop combination in the study area, where as increase in the number of mandals has been noticed In three crop combination and four crop combination only.

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