# Crop Combination Pattern in Nizamabad District of Telangana

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**Abstract:**

The Crop Combination analysis technique identifies and locates areas sharing significant proportion of crop at higher rank, thus helps to understand the agricultural mosaic, cropping pattern, crop concentration, cropping variation, crop diversification and operation of a given area thus aiding to draw a rough sketch of agricultural topology and provide agricultural regionalization. Nizamabad district of Telangana is mostly based on agriculture and is occupied by different crops, which requires agricultural planning. In the present study an attempt has been made to demarcate the crop combination regions of agronomic years 2009-10 and 2019-2020 along with the variations observed. The author has purposively selected Weaver calculated deviation of the real percentage of crops for all the possible combinations in the component area units against theoretical standard, is more accurate objective and scientific in delineation of crop combination regions. In the atmosphere of major crop generalization in Nizamabad a tendency of more combination of major crop can be smelt. The crop combination of Nizamabad is only restricted up to four crops.

**Keywords**: Crop combination, Land Use Patterns, Choropleth maps.

**Introduction:**

The study of crop combination minimizes the danger of over simplified generalization of crops. Crop combination is used to show the importance of a particular area. Due to this, the farmers may give priority to grow crops which are more suitable in a particular area.

The concept of crop combination is scientific device to study the existing spatial relationship of crops in association with each other in agricultural geography and land utilization. Such study is necessary in order to have a more comprehensive view of agricultural regions. It measures the areal dominance of crops, which are closely related and which occur together in varying strength. This idea of crop combination could be best utilized in understanding the existing agricultural situations, the land use patterns of study area and the planning for the future.

In order to understand the cropping pattern in a particular study area, study of crop combinations is imperative. The crop combinations on one hand give an idea about the agricultural typology, agricultural economics and agricultural income of a region and on the other; it gives an insight in the cropping practices and rotation of crops which are quite pertinent for the maintenance of soil fertility. Indian farmers on the basis of their long experience as cultivators have adopted certain crops to be sown in Kharif and Rabi seasons. The growing demand for food to meet the requirement of increasing population and the expansion of arable land demands a careful and judicious utilization of land by selecting appropriate crop

combinations to increase the production of food crops on to save soil depletion. It is therefore, essential to identify and adopt the crop combinations for each agricultural set-up which give optimum agricultural returns.

Many times, the agricultural regions are known after their dominant crops like paddy, Sugarcane, groundnut, Mango and so on. Such studies have confined themselves only to the dominant individual crops rather than the complex agricultural system. This results in over generalizations because the individual crop combination region constitutes a significant aspect of agricultural geography as it provides a sound basis for the development of planning in agriculture.

The general understanding of the particular combination of the crops and their relative importance of each in an area can be very helpful interpreting some aspects of social and economic geography of the region. Accordingly, a large number of experts have suggested a number of statistical tools to delineated crop combination regions. The following are worth mentioned here: J.c. Weaver (1954) "Least square deviation method", J.J.Nelson (1985) "standard deviation method", S.M.Rafiullah (1989) "maximum positive deviation method", L.L.Pownall (1995) "mean positive deviation method", Kukukazi Doi (1999) "modified minimum deviation method', A.G. Athawale (2000) "lower limit method", Kostrowike (2002) "successive quotient method" and N.P.Iyyar (2006) "maximum distance method".

**Study Area:**

● Nizamabad division lies between 18.40°N to19.00°N latitudes and **18.6° N latitude** and **78.1° E longitude Area**. Geographically it is extended over an area of **4,288 square kilometers**. and administratively the district is divided into 3 major Administrative Divisions and further into 29 Mandals. The selected Division of the District are shown in Figure No. 1.1 and the Administrative SubDivisions (mandals) of the individual selected Divisions (Nizamabad) are shown in Figure No. 1.2 and 1.3 respectively. The principal rivers flowing in the district are the Godavari on the northern boundary and Manjira, the chief tributary of the Godavari. There are fourteen mandals in Nizamabad division. The average temperature of the district lies between 28°C to 42°C. It helps for growth of variety of food and non-food crops.



**Objectives:**

● To have a comparative study of crop combination regions for the cropping year of 2009-

- 2010 and 2019-2020.
- To understand the crop Combination pattern of various Mandals of the district.
- To show the reasons behind limited variations in results between 10 years of gap.

**Technology Used:**

For the delineation of crop combinations, a more reliable and rational approach was adopted by weaver. In his study of crop combination regions in the Middle West, weaver demarcated crop associations development in terms of variables based on certain differences which are relative and so absolute. This method which is based on statistical approach is more scientific and hence authentic. In his study he has taken into account the percentage of the harvested cropped land in each of 1,081 countries covered in his work. Weaver calculated deviation of the real percentage of crops for all the possible combinations in the component area units against theoretical standard. The theoretical curve for the standard measurement was calculated as follows-

Monoculture       = 100 per cent of the Gross Cropped Area of one crop
Two Crop Combination    = 50 per cent in each of two crops
Three Crop Combination   = 33.33 per cent in each of three crops
Four Crop Combinations   = 25 per cent in each of four crops
Five Crop Combination    = 20 per cent in each of five crops and so on.

For the determination of the minimum deviation for each of the component area units the Standard Deviation method was used in the following way.

However, Weaver has pointed out the relative rank of the amount of deviation among the several possible combinations as was desired by him and not the actual magnitude of the deviation, the square root was extracted in accordance with the standard deviation formula. The special used variant can, therefore, be expressed as follows-

Where 'd' is the difference between the actual crop percentages in a given area's unit and appropriate percentage in the theoretical curve and 'n' is the number in a given combination.

Weaver's method has admirably been accepted and applied for the demarcation of crop combinations by geographers. The technique, however, gives most unwieldy combinations for the area units of high specialization.

**Methodology:**

For the present study secondary data have been applied which is published in Agricultural Statistical Abstract of Nizamabad District during 2009-2010 and 2019-20. Mandals have selected as an aerial unit. Crops have been considered for the present investigation. J.c. Weaver (1954) "Least square deviation method", has been used for the calculation of Crop combination. Whereas, calculated data depicted by Choropleth maps.

**Results and Discussion:**

Computing crop combination regions Combination Analysis in geographical studies requires distributional analysis to shape crop geography. It is used to evaluate adequacy or inadequacy in the essential agricultural landscape. Combination is more common than a crop occupying particular isolation in a given areal unit and a cropping year. The technique is used to identify and locate areas sharing significant proportion of crop at higher rank. As it can delineate rice, wheat etc. producing areas, it is also known as regional

distribution analysis. An attempt has been made to show the changes in the crop combination regions, during the periods of 2009-2010 and 2019-2020. Investigations show that not much significant change has been observed. The environmental constraints owing to geomorphic situation soils and climate have put the limit on diversified agricultural productivity. J.c. Weaver method has identified mono, two, three, four, Five and Six crop combinations in study area. in Nizamabad Division.
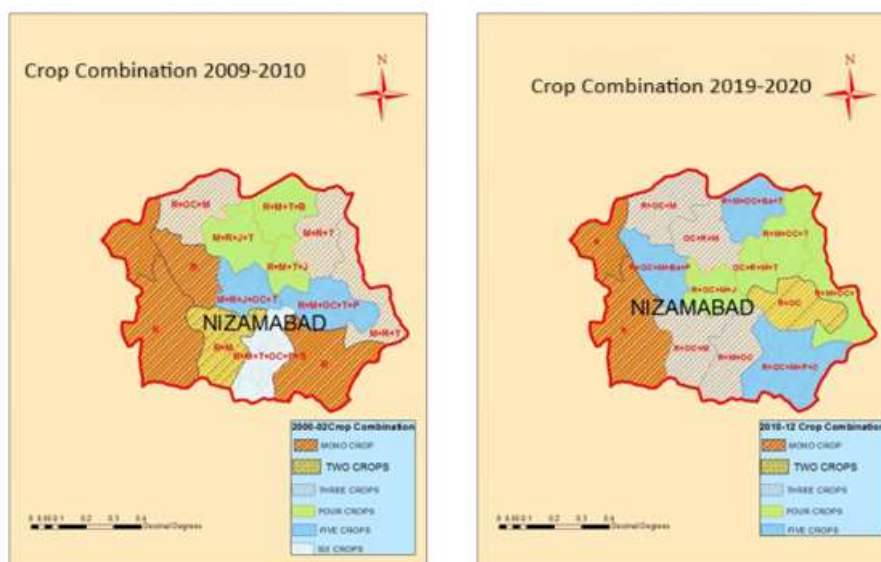


| S.no | Name of the Mandal | Crop Combination | | | |
|---|---|---|---|---|---|
| | | 2009-10 | | 2019-20 | |
| | | No.Of.Crops | Crop Combination | No.Of.Crops | Crop Combination |
| 1 | Nizamabad | Mono crop | Ri | Mono crop | Ri |
| 2 | Navipet | Mono crop | Ri | Mono crop | Ri |
| 3 | Makloor | Mono crop | Ri | Five Crops | Ri+OC+Ma+Ba+Pu |
| 4 | Nandipet | Three crops | Ri+OC+Ma | Three crops | Ri+OC+Ma |
| 5 | Armoor | Four Crops | Ma+Ri+Jo+Tu | Three crops | OC+Ri+Ma |
| 6 | Balkonda | Four Crops | Ri+Ma+Tu+B | Five Crops | Ri+M+OC+Ba+Tu |
| 7 | Jakranpally | Five Crops | Ma+Ri+Jo+OC+Tu | Four Crops | Ri+OC+Ma+Jo |
| 8 | Dharpally | Six Crops | Ri+Ma+Tu+OC+Pu+Su | Three crops | Ri+Ma+OC |
| 9 | Dichpally | Two Crops | Ri+Ma | Three crops | Ri+OC+Ma |
| 10 | Sirkonda | Mono crop | Ri | Five Crops | Ri+OC+Ma+Pu+Co |
| 11 | Vailpoor | Four Crops | Ri+Ma+Tu+Jo | Four Crops | OC+Ri+Ma+Tu |
| 12 | Bhemgal | Five Crops | Ri+Ma+OC+Tu+Pu | Two Crops | Ri+OC |
| 13 | Morthad | Three crops | Ma+Ri+Tu | Four Crops | Ri+Ma+OC+Tu |
| 14 | Kammarpally | Three crops | Ma+Ri+Tu | Four Crops | Ri+Ma+OC+Tu |

**MONO CROP COMBINATION:**

An examination of the crop combination (figure no.) for the period 2009-10 reveals that mono-culture with rice crop is found in the four mandals namely Nizamabad, Navipet, Makloor, and Sirkonda. During

2019-20 reveals that mono-culture with rice crop is found in only two mandals namely Nizamabad and Navipet.

## TWO CROP COMBINATIONS:

Two crop combinations were found in Nizamabad Division; during 2009-10 one Mandal adopted a two-crop combination. Dichpally had a combination of rice and Maize. During 2019-20, in Nizamabad Division adopted a two-crop combination. Bheemgal had a combination of Rice and Other Crops. Dichpally shifted two crop combinations to three crop combinations in a span of ten years.

## THREE CROP COMBINATIONS:

Three crop combinations were observed in Nizamabad Division, between 2009 and 2010, in Nandipet. Nandipet adopted a combination of rice, other crops and Maize, and Morthad, Kammarapally adopted a combination of Maize, Rice and Turmeric. Between 2019 and 2020 four stations observed three crop combinations and these were Nandipet, Armoor and Dharpally, Dichpally. Three crops that entered in this combination were Rice, Maize and Other Crops in the three stations. The combination changed much in the span of eleven years, from four, five, six combinations to three combinations.

## FOUR CROP COMBINATIONS:

In Nizamabad Division, the four-crop combination was observed in three stations which are Armoor and Vailpoor between 2009 and 2010. The four crops were rice, maize; Jowar and Turmeric, and Balkonda had a Rice, Maize, Bajra and Turmeric. Between 2019 and 2020, the four stations which adopted the four-crop combination were Jakranpally, Vailpoor, Morthad and Kammarpally. The combination of crops varied from station to station. Jakranpally had a crop combination of Rice, Other crops, maize and Jowar. While in Vailpoor, Morthad and Kammarpally a domination of Rice, Maize, Other crops and Turmeric.

## FIVE CROP COMBINATIONS:

During 2009-10 in Nizamabad Division, The Five crop combination was observed in two stations which are Jakranpally and Bheemgal. The combinations of crops varied from station to station. Jakranpally had five crops were maize,Rice, Jowar,Other crops and Turmeric and Bheemgal had a Rice, Maize, Other crops, Turmeric and Pulses. During 2019 and 2020, the combinations of crops varied from station to station. Makloor had a Rice, Other crops, Maize, Bajra and Pulses. Balkonda had Rice, Maize, other crops, Bajra and Turmeric. And Sirkonda had a Rice, Other crops, Maize, Pulses and Cotton.

## SIX CROP COMBINATIONS:

During 2009-10 in Nizamabad Division, the six-crop combination was observed in Dharpally Only. The six crops were Rice, Maize, Turmeric, Other crops, Pulses, Sugarcane.

During 2019-20, from the table (1) it is evident that no Six crop dominates the agricultural scene of the Nizamabad division.

## Conclusion:

A disparity of ten years shows not much change in crop combination as expected due to globalisation. Though in 2009-10, the crop combination was restricted to three crops the scenario changed not much in 2019-20, The main cause for a generalization tendency is due to the district's Irregular

rainfall patterns and frequent droughts have made farmers switch to less water-demanding or short-duration crops, adjusting to climate risks. With the expansion of irrigation facilities like canals from the **Sri Ram Sagar Project (SRSP)** and increased borewell usage, farmers shifted from traditional rainfed crops (like jowar, bajra) to more water-intensive and profitable crops like paddy and sugarcane.. Higher prices for crops like turmeric, cotton, maize, and soybean have encouraged farmers to diversify or shift completely from food grains to commercial crops.Where in one hand such deposits suits best for monocrop or two crops cereal combinations, these can to some extent withstand in the aforesaid calamity. Also may be somewhere a fear seeds for restriction from diversity. The farmers do not believe in 'no risk,no game' thus hardly ever attempt for diversification in even better conditions. Moreover a tradition of rice and Maize cultivation persists which provides support to generalization. A block wise disparity persists, which clearly indicates the scope of diversity. Nevertheless, a change can be seen which can pave the way to a better combination.

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