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VEGETABLE FARMING IN HARYANA: A GEOGRAPHICAL STUDY

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Abstract: Green revolution led to the massive growth in cereal production and made Haryana state as one of the most productive states in India. Thanks to states like Haryana and Punjab, food crisis that India used to face had been averted. But the cereals like rice and wheat led to the negligence of crop diversity in the state. Due to support from government in the form of MSP, maximum farmers grew only these two cereals. With the advancement in economic and social condition of people, food requirement changes were felt. All the nutrient food like fruits and vegetables are needed for absolute growth of an individual, which was realised by families, mostly in urban areas. To meet demands of these changing food habits, horticulture growth is being promoted by government in last two decades. It has become necessary on both the producer and consumer level. The changing climatic conditions, pressure on land, excessive use of fertilisers and pesticides and limited availability of water resource are the main reasons that the government as well as farmers are seeking an alternative to food grains. Horticulture also fulfils, nutritional requirements of people which are increasing rapidly in the present decades because of more awareness among people regarding their health and dietary habits. As the consumption pattern changes so we need to also change the production pattern. Hence, the government of Haryana is investing hugely to increase the production of horticultural crops. Main schemes of state as well as that of centre are being implemented in the state to increase the output ads to support and encourage the producers in this regard. Vegetables form an important and main part of horticultural crops in Haryana. The present piece of research work has been focused on vegetable farming to identify the pattern of vegetable crops as well as best crop combination in the study area. To improve production in a sustainable manner, it is necessary to comprehend the patterns of production. It is observed that horticulture farming holds bright future in prospects of farmer of the state, as it can lead to increase in their income and can improve their social status as well. But to achieve these said goals, a focus is needed to understand the varieties of crops and which crops are suited on which type of land and requires what amount of water. So, that the clear picture about vegetable crop combinations are essential to better understand the horticulture production and further valuable decision making to uplift the economy of the farming society.

Key words: Vegetable Crop, Crop Combination, J.C. Weaver's (1954) & Doi's (1959) method.

I. Introduction:

Haryana is historically an agriculture based state and farming practices are not new to its people and this place. After becoming a state in 1966 and after the success of Green Revolution, the focus was mainly on production of rice and wheat. But with the latest researches and specifically after the decade of 1990s the damage done to soil on one of the finest agricultural lands in the state, the alternatives to rice and wheat are tried to be found out and focussed on. Also, the food on the table needs to be more than cereals and self-sufficiency cannot be brought by growing two crops. Keeping this in view, Government of Haryana is focussing on other agricultural products like vegetables and fruits.

Horticulture products definitely give us a better alternative in terms of financial growth as well as environmental protection. The main horticulture crops of Haryana, that is, those grown in worthy quantities are fruits and vegetables. Although, medicinal plants and floriculture is also proliferating in some states of India.

The vegetables grown in Haryana depends on numerous factors like soil, climate, rainfall etc. But Haryana is mainly a plain area so the variations amounting to terrain are few. Although, the type of soils found in various parts of Haryana varies from alluvial to loamy and sandy. Thus, the type of vegetables grown also varies.

Haryana is also a water deficit state. Overall, rainfall in the state is less than many states like UP, Maharashtra etc. and it increases the pressure on underground water. This leads to excessive usage and the water is not replenished. The result is that with less rainfall and depleting underground water resources, Haryana may face huge water crisis in the near future. Although, Haryana is well drained by tube wells and canals, yet one should avoid growing vegetables which use huge amount of water because water misuse and overuse is one of the main reasons at the first place that one is looking for alternative to crops like rice and sugarcane. Some of such vegetables are radish, tomatoes and cucumber.

This study has focussed on the type of vegetables that grow in various parts of Haryana. By this study, the researcher has tried to find out the direction in which the growth in this sprouting sector is headed.

II. Study Area:

Geographically, Haryana is a state of north India which came into existence on 1st November 1966 after the recommendations of Shah Commission. It has a stretch of 27 39 to 30 55 5 north latitude and from 74 24 8 to 77 36 5 east longitudes. On the eastern side of the state is Uttar Pradesh and union territory of Delhi. Also, most of the part of the state is bounded by Uttar Pradesh. Himachal Pradesh lies to its north and north-east. North-west part is surrounded by its capital and union territory of Chandigarh and Punjab. Rajasthan bounds the state on south and south-west. The state shares no international border. Administratively, it is divided into six zones which are Ambala, Hisar, Rohtak, Gurgaon, Karnal and Faridabad.

Haryana state is mainly a plain region i.e. mainly 94% of the area is plain but there are some mountains like Siwalik Hills in the northeast and Aravalli in the south. Some regions also see the spread of spread of Thar Desert in the southern parts.

Climatologically, the study are falls into the category of sub-humid to arid. The main soil type in the state is alluvium. It is of two types: bhangar and khadar which are old and new alluvium respectively. The sandy soils are more found in the western parts of the state.

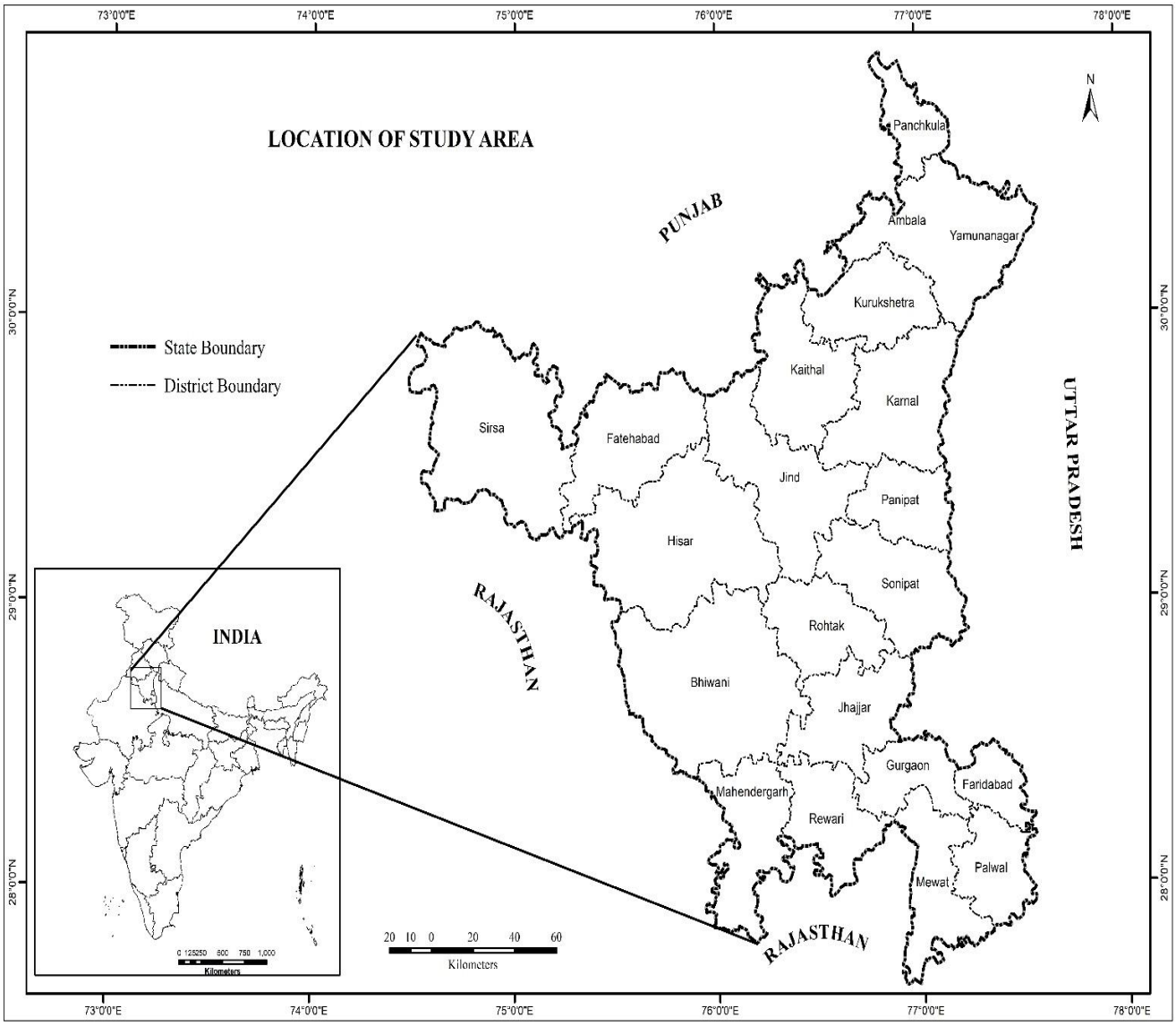

Figure 1: Location of Study Area

III. Objectives of the Study

1) To study about the existing vegetable cropping pattern in the study area.
2) To study the vegetable crop combination in the study area.
3) To identify the best vegetable crop combination in the state of Haryana.

IV. Data Base and Methodology

The present research work has been carried out on basis of secondary source of data at district level. All the required data related to present work has been collected from horticulture department, Government of Haryana for the financial year 2017-18. It is the base of present work. J.C. Weaver's (1954) and Doi's (1959) crop combination methods has been applied to achieve the objectives of the study.

J.C. Weaver's (1954) method:

$$\text{Crop Combination Index: } SD = \sum d^2 / n$$

(Where, d = is the difference between actual crop % in a given unit area and the appropriate % in the theoretical curve, n = is the no. of crops in a given combination.)

Doi's (1959) method:

$$\text{Crop Combination Index: } SD = \sum d^2$$

V. Results and Discussions

On basis of J.C. Weaver's Crop Combination Method (1954) onion, potato and cauliflower vegetables are dominant crop combination in the districts like Panchkula, Ambala, Kaithal and Yamunanagar. It is observed that cauliflower is grown in many districts of the state as a major vegetable crop except some dry districts like Palwal and Mewat. This is because the vegetable needs good organic matter and well-drained soil. The districts where irrigation cannot be made available are not convenient for its growing. Radish is mainly found in Panchkula, Ambala, Yamunanagar, Kurukshetra, Kaithal, Karnal, Panipat, Sonipat, Jhajjar, Mahendargarh, Rewari, Gurgaon,Hisar, Fatehabad, Sirsa, Jind and Mewat (Table-1). This vegetable is also highly dependent on availability of water and is grown in districts which can provide it.

Sr. No.	Name of District	Vegetable Crop Combination
1	Panchkula	Onion-Potato-Tomato-Cauliflower-Radish
2	Ambala	Onion-Potato-Tomato-Cauliflower-Radish
3	Yamunanagar	Potato-Tomato-Cauliflower-Radish-Bottle gourd
4	Kurukshetra	Potato-Cauliflower-Radish-Carrot-Cucumber
5	Kaithal	Onion-Cauliflower-Cabbage-Potato-Radish
6	Karnal	Potato-Cauliflower-Tomato-Radish-Cucumber
7	Panipat	Cauliflower-Cabbage-Carrot-Radish-Potato
8	Sonipat	Cauliflower-Radish-Carrot-Cabbage-Potato
9	Rohtak	Carrot-Tomato-Cucumber-Bottle Gourd-Cabbage
10	Jhajjar	Radish-Tomato-Bottle Gourd-Carrot-Onion
11	Faridabad	Bottle Gourd-Carrot-Cabbage-Cauliflower-Ridge gourd
12	Mahendergarh	Radish-Carrot-Cauliflower-Bottle gourd-Cabbage
13	Rewari	Radish-Onion-Carrot-Tomato-Cucumber
14	Gurgaon	Cauliflower-Bottle Gourd-Tomato-Radish-Cucumber
15	Bhiwani	Tomato-Bottle Gourd-Onion-Cauliflower-Cucumber
16	Hisar	Carrot-Cauliflower-Cabbage-Radish-Tomato
17	Fatehabad	Radish-Cauliflower-Cabbage-Carrot-Bottle gourd
18	Sirsa	Cauliflower-Radish-Carrot-Potato-Cabbage
19	Jind	Tomato-Radish-Carrot-Cauliflower-Cabbage
20	Mewat	Tomato-Onion-Bottle Gourd-Ridge Gourd-Radish
21	Palwal	Bottle Gourd-Tomato-Ridge Gourd-Cucumber-Cauliflower

Table 1: Vegetable Crop Combination by J.C. Weaver Method (1954)

Potato is a major vegetable of Panchkula, Ambala, Yamunanagar, Kurukshetra, Kaithal, Karnal, Panipat, Sonipat and Sirsa. The type of soil needed is loamy. But the rainfall required is between 120-200 cm. this water requirement can also be fulfilled by irrigation facilities. Tomato is grown mainly in Panchkula, Ambala, Yamunanagar, Karnal, Rohtak, Jhajjar, Rewari, Gurgaon, Bhiwani, Hisar, Jind, Mewat and Palwal (Figure 2&3). Tomatoes can be successfully grown in sub-tropical climate and require 60-150 cm rainfall. The water requirements can be fulfilled with good irrigation. Sandy and loamy soilsare considered best for its growth. Although, with extra efforts it can be grown on many types of soil but is most resistant to clayey soil. Carrot is mainly grown in Kurukshetra, Panipat, Rohtak, Sonipat, Jhajjar, Faridabad, Mahendargarh, Rewari, Hisar, Fatehabad, Sirsa and Jind. Sandy and loamy soils are best for its cultivation. Their water requirement is less when compared to other crops.

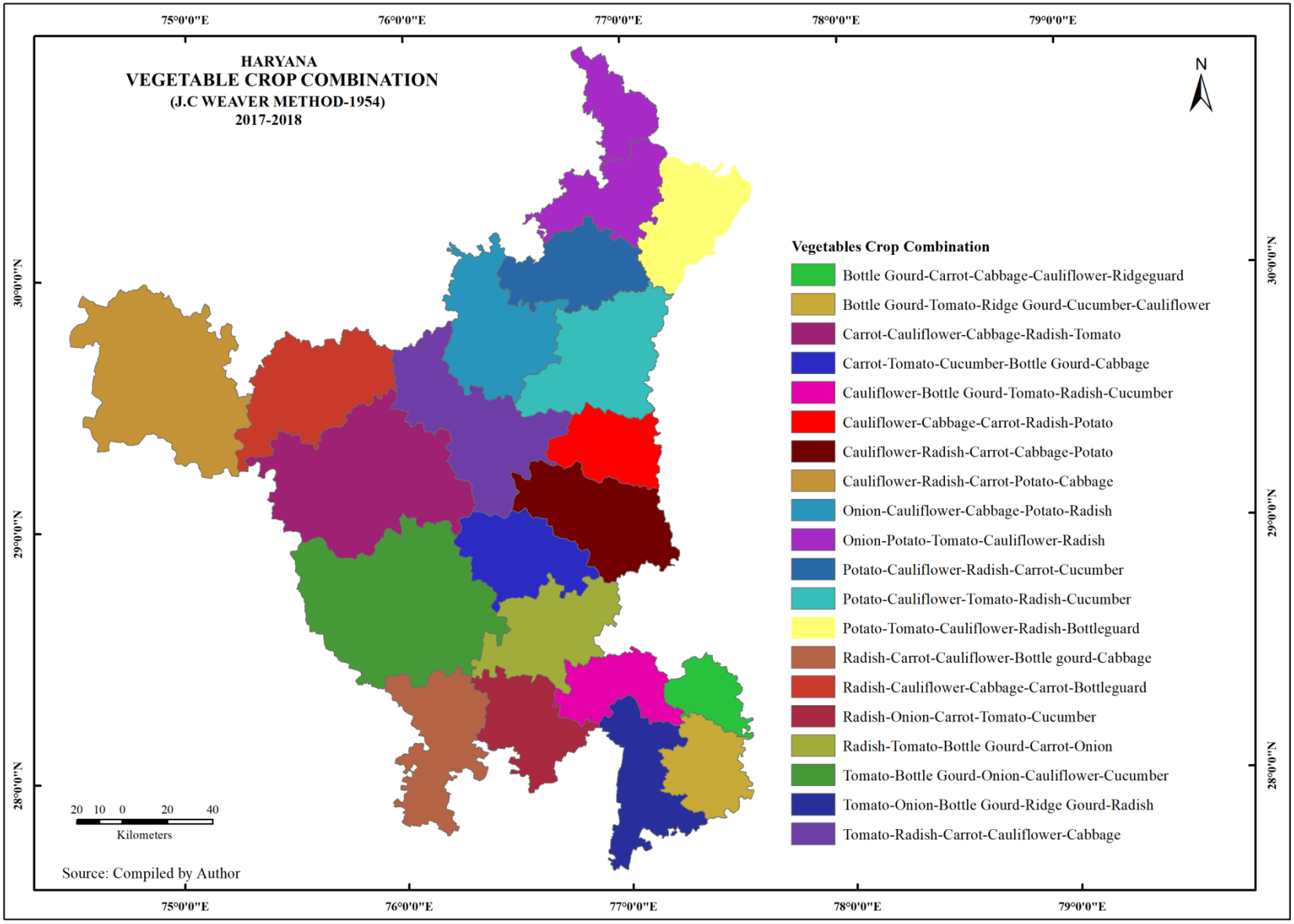

Figure 2: Vegetable Crop Combination by J.C. Weaver Method (1954)

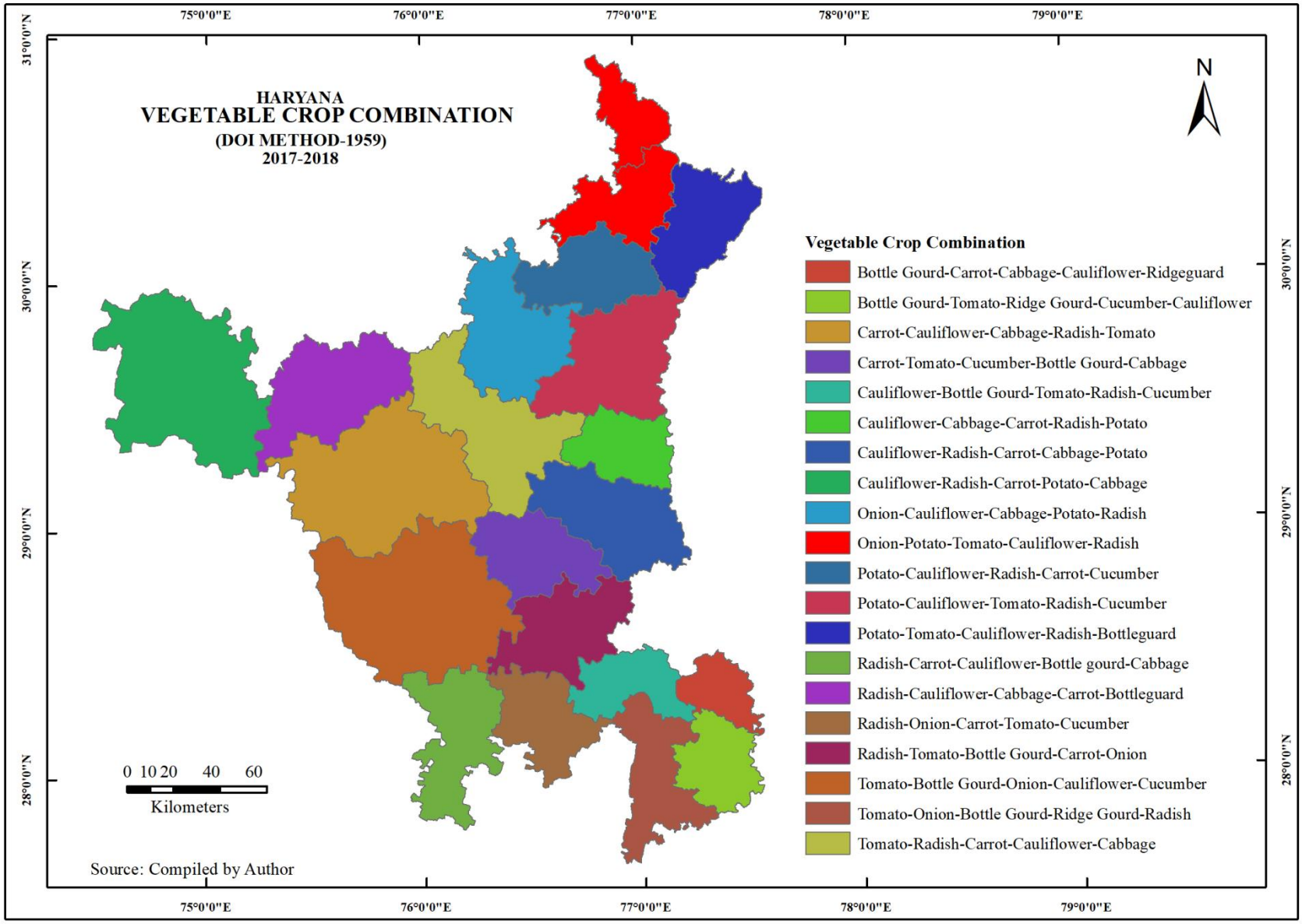

Figure 3: Vegetable Crop Combination by Doi's Method (1959)

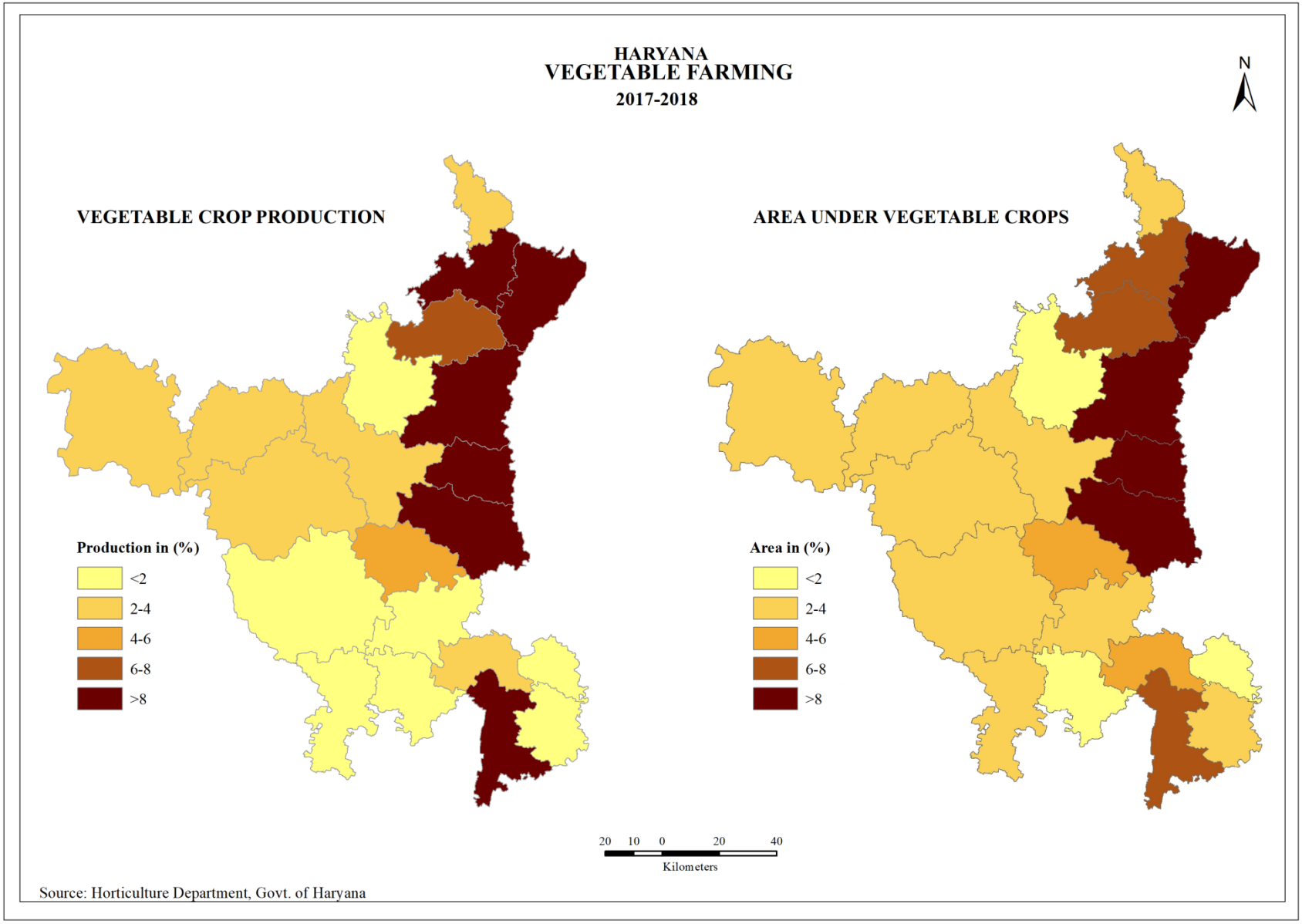

Figure 4: Vegetable Cropping Pattern, Year 2017-18

Doi's Crop Combination Method (1959)

Table No2: shows the results obtained with application of Doi's Crop Combination (1959) method.

Sr. No.	Name of District	Vegetable Crop Combination
1	Panchkula	Onion-Potato-Tomato-Cauliflower-Radish
2	Ambala	Onion-Potato-Tomato-Cauliflower-Radish
3	Yamunanagar	Potato-Tomato-Cauliflower-Radish-Bottle gourd
4	Kurukshetra	Potato-Cauliflower-Radish-Carrot-Cucumber
5	Kaithal	Onion-Cauliflower-Cabbage-Potato-Radish
6	Karnal	Potato-Cauliflower-Tomato-Radish-Cucumber
7	Panipat	Cauliflower-Cabbage-Carrot-Radish-Potato
8	Sonipat	Cauliflower-Radish-Carrot-Cabbage-Potato
9	Rohtak	Carrot-Tomato-Cucumber-Bottle Gourd-Cabbage
10	Jhajjar	Radish-Tomato-Bottle Gourd-Carrot-Onion
11	Faridabad	Bottle Gourd-Carrot-Cabbage-Cauliflower-Ridge gourd
12	Mahendergarh	Radish-Carrot-Cauliflower-Bottle gourd-Cabbage
13	Rewari	Radish-Onion-Carrot-Tomato-Cucumber
14	Gurgaon	Cauliflower-Bottle Gourd-Tomato-Radish-Cucumber
15	Bhiwani	Tomato-Bottle Gourd-Onion-Cauliflower-Cucumber
16	Hisar	Carrot-Cauliflower-Cabbage-Radish-Tomato
17	Fatehabad	Radish-Cauliflower-Cabbage-Carrot-Bottle gourd
18	Sirsa	Cauliflower-Radish-Carrot-Potato-Cabbage
19	Jind	Tomato-Radish-Carrot-Cauliflower-Cabbage
20	Mewat	Tomato-Onion-Bottle Gourd-Ridge Gourd-Radish
21	Palwal	Bottle Gourd-Tomato-Ridge Gourd-Cucumber-Cauliflower

Table 2: Vegetable Crop Combination by Doi's Method

In present case the same crop combinations has been obtained from both the methods of crop combination. Figure.4: represent the district wise concentration of vegetables in Haryana. The major districts of vegetables are Yamunanagar, Karnal, Panipat, Sonipat and Ambala. The major vegetables grown in the above stated districts are cauliflower, cabbage, carrot and radish. Butthe production does not give a complete picture without patterns which are observed district wise. The patterns and various combinations discussed above, together shows the crops grown. The system observed helps us to understand the why and how of the production.

Conclusion

The cropping pattern and production of vegetable crops in relation to agro-climatic conditions of the state can be providing high standard of productivity and quality. The crop combinations and production pattern has been clearly indicated that environment friendly manner should be required to adopt for a particular area and crop. Otherwise, we will end up facing the same problems that we have with other cereal crops like rice. If we do not change our cropping patterns that we will end up creating hazard for the soil and climate. So, we can conclude that, even if we are shifting to horticultural products like vegetable cropsand putting efforts to promoteit, then this time we should do it in a sound and suitable way. Long term repercussions should be kept in mind while adopting agricultural practices and the same goes for the vegetable crops.

With the above discussion it have concluded that even after putting extra resources like fertilisers and irrigation facilities, there is a limit to the extent of using natural resources. The naturally available factors like suitable type of soil along with rainfall becomes necessary for good production of vegetable crops. Thus, to make vegetable farming a successful type of farming practice, we have to understand the physiography of a region and try our best to not exploit the natural resources available to us.

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