

## Spatio-Temporal Pattern of HYV of Seeds Technology in Ahmednagar District –A Geographical Perspective

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| Article Info                                                                                                                                                                                                                                                             | ABSTRACT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| <p><b>Article History:</b><br/>Received: 16<sup>th</sup> Sep 2025<br/>Accepted: 01<sup>st</sup> Oct 2025<br/>Published: 14<sup>th</sup> Oct 2025</p> <p><b>Keywords:</b><br/>Agriculture productivity,<br/>HYV,<br/>crop ranking,<br/>planning,<br/>Seeds technology</p> | <p>The present study is find out to analyze the agricultural productivity pattern or HYV levels technology in Ahmednagar District during the year 1991-2011. This study is based on secondary data. Agriculture production is influenced by physical, climatologically, socio-economic, and technological and organization factors, and farmer's attitude etc. An Endeavour is made here to study why the agricultural productivity varies in different tahsil. The data regarding area under different crops has been computed with the help of Kendall's ranking co-efficient technique of agricultural productivity. Ten crops have been considered for calculating the agricultural productivity. Among these, wheat, jowar, bajara, sugarcane, gram, maize, sugarcane, cotton, mug etc. are the major crops. By computing agricultural productivity, ranks according to their how much area under different crops in Ahmednagar district have identified ten crops. Present study gives an idea of real situation of agricultural productivity and helps to minimize the regional inequalities. in Ahmednagar District and also helps to planners, agricultural scientists and research scholars. Result shows there is positive and significant of Spatio-Temporal Pattern of HYV of Seeds technology in Ahmednagar District.</p> |

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**Introduction:**

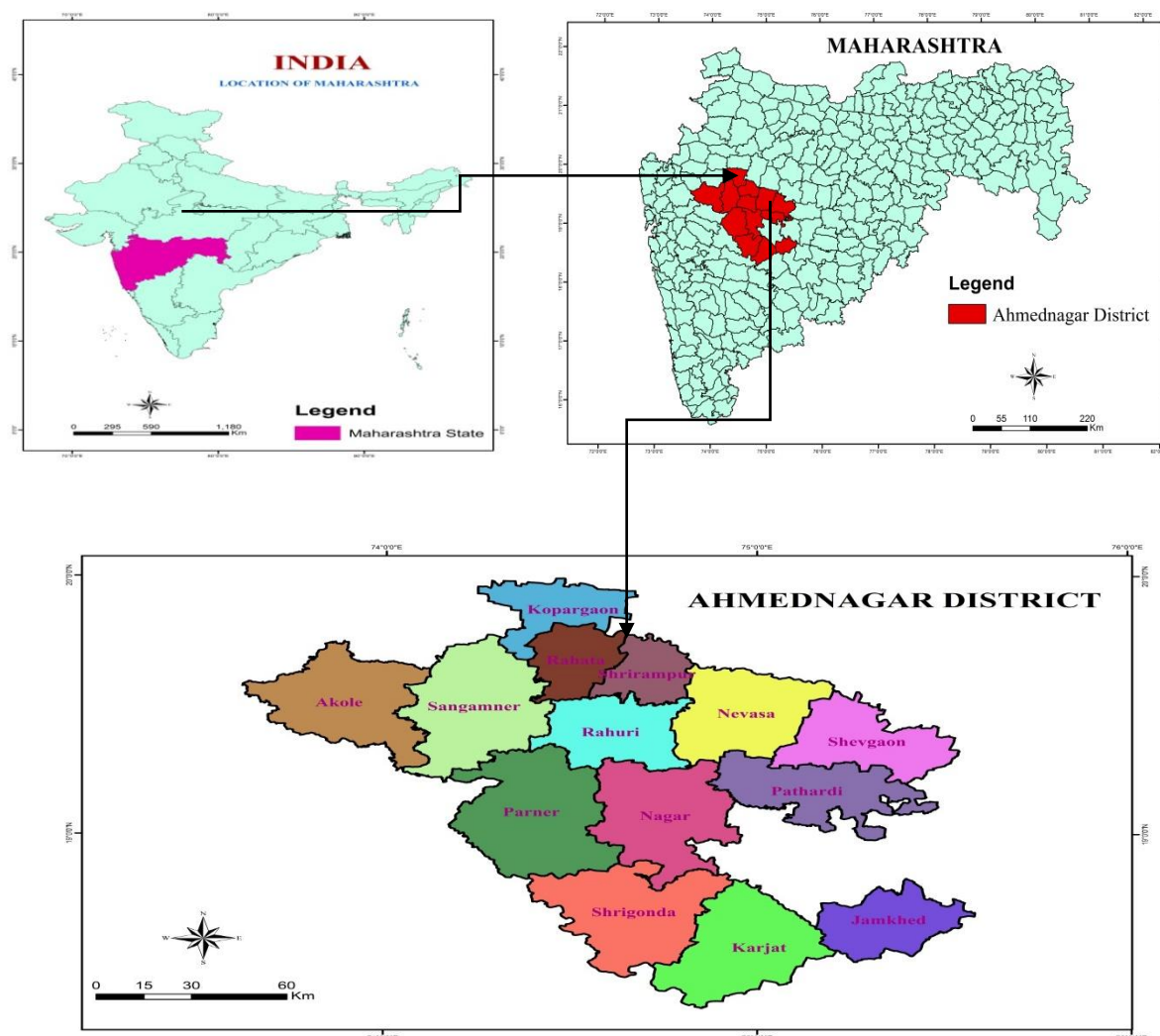
Agricultural productivity depends on a great amount upon the use of the quality of seeds. All other inputs like fertilizers, pesticides and improved implements will go for nothing unless complemented by improved and quality of seeds (Jalan, M.L., 1987). Introduction of High Yielding Varieties (HYVs) is one of the important beginning stages of agricultural development in the region. HYVs of seeds breeding technology is considered as a revolutionary change from the age-old tradition to modern innovation in the practice of agriculture. In the green revolution technology, the high yielding varieties of seeds are the main input of agricultural production. It helps chiefly to use the land for double cropping pattern and multiple cropping patterns etc. resulted in high productivity. The Government of Maharashtra tried to introduce the improved varieties of seeds of several crops in different districts.

In recent decades, new areas and cultivable waste have been carried under cultivation to increase agricultural production. In the mid-sixties, a major innovation in agriculture was made in the form of the adoption of HYV of cereals. The development is also known as the Green Revolution in the developing countries. The production of wheat, rice, maize, and millets increased considerably. However, the Green Revolution could not eradicate malnutrition from the developing world. The HYV of seeds needs heavy doses of chemical fertilizers and an adequate supply of water through controlled irrigation. These costly inputs are beyond the reach of marginal and small farmers of the third world countries. There is a need to develop drought-resistant crops that may be diffused in the areas of deficient rainfall (Husain, 1979).

**Study Area:**

The present study has been selected of Ahmednagar district . It extends between 18° 20' and 19° 59' north latitudes and 73° 40' to 75° 43' east longitudes located in part in the upper Godavari basin. The Godavari, Bhima River is the two main rivers in this district with the major tributaries are Pravara, Mula, Sina, Dhora, Kukdi etc. Total 17,048 square km geographical area with administration divided into 14 tahsils. 578.8 mm is average annual rainfalls and mean daily maximum and minimum temperatures is 39°C and 11.7° C. Respectively. 71.10 percent area under cultivation area out of them 32.40 percent is irrigated and 67.60 percent rain shadow area. In 2011 census population is 45, 43,083. and 266 persons per square kilometers was density of population.

### Location Map of Ahmednagar District



**Fig.1.1**

#### **Objectives:**

1. To Study the Spatio-Temporal Pattern of Level of HYV of Seeds technology.
2. To Analysis the Absolute Change in Level of HYV of Seeds technology.
3. To Find out the Impact of HYV of Seeds technology on Agricultural Productivity.

#### **Database and Methodology:**

The Present Study work is based on the secondary data (1911-2011). it has been Collected through the Govt. District Superintendent Agricultural office and Z.P. (Agricultural Department). and District statistical Department and District socio-economic abstract of Ahmednagar District and For the present investigation, District is selected as in general and tahsils in particular. Statistical method has used to Kendall's ranking co-efficient method in present study of Changes in rural area of agricultural productivity in Ahmednagar District. In order to assess, pattern of agricultural productivity the following formula has been adopted. It

means total number of rank in a given county divided by total number of crops in that region. This research paper is Published, unpublished, various journal. The suitable technique map, table, types of collected data and their interpretation with analyzed which is supporting in research paper.

## Result and Discussions:

### A) Spatio-Temporal Pattern of Level of HYV of Seeds technology

Table 1.1 exhibits that the total area under HYV of seeds as the whole district has 26.87 per cent during the period of 1991, it is raised up to 51.52 per cent in 2011. (Table 1.2) But the spatial distribution of the area under HYV of seeds varies from crop to crop and tahsil to tahsil during the period of investigation in the study area. Therefore, it is divided into four categories on the bases of mean and standard deviation i.e. high (above Mean +1SD), moderate (Mean to Mean +1SD), low (Mean-1SD to Mean) and very low (below Mean-1SD).

**Table 1.1**  
**Tahsil-wise Ranking of Area under HYV Seeds in Ahmednagar District, 1991**

| Sr. No. | Name of Tahsil | Wheat | Jowar | Bajra | Maize | Gram | Tur | Mug | Sugar cane | Cotton | Groundnut | Total       |
|---------|----------------|-------|-------|-------|-------|------|-----|-----|------------|--------|-----------|-------------|
| 1       | Akole          | 5     | 2     | 5     | 3     | 2    | 2   | 2   | 7          | 0      | 3         | 32          |
| 2       | Sangamner      | 3     | 2     | 3     | 3     | 2    | 1   | 2   | 4          | 6      | 3         | 29          |
| 3       | Kopergaon      | 3     | 1     | 4     | 4     | 3    | 2   | 2   | 4          | 0      | 6         | 29          |
| 4       | Rahata         | 3     | 1     | 6     | 7     | 2    | 3   | 0   | 8          | 8      | 6         | 44          |
| 5       | Shrirampur     | 3     | 2     | 2     | 2     | 2    | 2   | 2   | 3          | 3      | 2         | 23          |
| 6       | Newasa         | 5     | 1     | 3     | 2     | 3    | 2   | 3   | 7          | 4      | 2         | 32          |
| 7       | Shevgaon       | 4     | 2     | 3     | 3     | 1    | 3   | 2   | 4          | 4      | 3         | 29          |
| 8       | Pathardi       | 3     | 2     | 3     | 3     | 2    | 2   | 2   | 3          | 2      | 2         | 24          |
| 9       | Nagar          | 3     | 1     | 3     | 2     | 2    | 2   | 2   | 3          | 0      | 2         | 20          |
| 10      | Rahuri         | 4     | 1     | 4     | 3     | 2    | 2   | 4   | 8          | 3      | 4         | 35          |
| 11      | Parner         | 3     | 1     | 1     | 2     | 2    | 1   | 1   | 2          | 2      | 2         | 16          |
| 12      | Shrigonda      | 3     | 1     | 2     | 3     | 1    | 3   | 2   | 2          | 2      | 2         | 23          |
| 13      | Karjat         | 4     | 2     | 3     | 3     | 2    | 2   | 2   | 6          | 2      | 2         | 28          |
| 14      | Jamkhed        | 4     | 2     | 5     | 4     | 2    | 2   | 2   | 6          | 0      | 3         | 31          |
|         | <b>Total</b>   |       |       |       |       |      |     |     |            |        |           | <b>26.8</b> |

**Source:** Compiled by the researcher on basis of Socio-Economic Abstract of Ahmednagar District, 1991

**Table 1.2**  
**Tahsil-wise Ranking of Area under HYV Seeds in Ahmednagar District, 2011**

| Sr. No. | Name of Tahsil | Wheat | Jowar | Bajra | Maize | Gram | Tur | Mug | Sugar cane | Cotton | Groun dnut | Total        |
|---------|----------------|-------|-------|-------|-------|------|-----|-----|------------|--------|------------|--------------|
| 1       | Akole          | 5     | 4     | 6     | 7     | 5    | 3   | 5   | 9          | 0      | 5          | 49           |
| 2       | Sangamner      | 8     | 2     | 4     | 9     | 3    | 2   | 3   | 5          | 7      | 4          | 47           |
| 3       | Kopargaon      | 5     | 2     | 5     | 6     | 3    | 3   | 5   | 7          | 7      | 7          | 49           |
| 4       | Rahata         | 6     | 2     | 6     | 5     | 4    | 3   | 3   | 8          | 8      | 5          | 50           |
| 5       | Shrirampur     | 5     | 2     | 6     | 6     | 3    | 4   | 3   | 8          | 7      | 7          | 51           |
| 6       | Newasa         | 7     | 6     | 7     | 9     | 8    | 9   | 7   | 8          | 7      | 6          | 74           |
| 7       | Shevgaon       | 7     | 5     | 6     | 7     | 0    | 5   | 4   | 8          | 5      | 6          | 53           |
| 8       | Pathardi       | 5     | 4     | 6     | 8     | 0    | 2   | 2   | 9          | 8      | 7          | 51           |
| 9       | Nagar          | 4     | 3     | 5     | 5     | 3    | 2   | 4   | 5          | 6      | 5          | 42           |
| 10      | Rahuri         | 6     | 4     | 6     | 6     | 7    | 9   | 0   | 8          | 8      | 6          | 60           |
| 11      | Parner         | 8     | 4     | 8     | 4     | 4    | 2   | 3   | 8          | 6      | 7          | 54           |
| 12      | Shrigonda      | 8     | 4     | 8     | 6     | 3    | 3   | 3   | 8          | 4      | 3          | 50           |
| 13      | Karjat         | 6     | 4     | 6     | 6     | 3    | 2   | 3   | 6          | 6      | 5          | 47           |
| 14      | Jamkhed        | 5     | 3     | 6     | 5     | 2    | 3   | 4   | 6          | 5      | 4          | 43           |
|         | <b>Total</b>   |       |       |       |       |      |     |     |            |        |            | <b>51.52</b> |

**Source:** Compiled by the researcher on basis of Socio-Economic Abstract of Ahmednagar District, 2013

**Table 1.3**  
**Tahsil wise Total rank, Ranking co-efficient, Rank and Absolute Change of Ahmednagar district**

| Sr.no | Tahsil     | Total Rank |      | Rank co-efficient |      | Rank No |      | Absolute Change (1991-2011) |         |
|-------|------------|------------|------|-------------------|------|---------|------|-----------------------------|---------|
|       |            | 1991       | 2011 | 1991              | 2011 | 1991    | 2011 | Rank co-efficient           | Rank No |
| 1     | Akole      | 32         | 49   | 3.2               | 4.9  | 11      | 5    | 1.7                         | 3       |
| 2     | Sangamner  | 29         | 47   | 2.9               | 4.7  | 9       | 4    | 1.8                         | 4       |
| 3     | Kopargaon  | 29         | 49   | 2.9               | 4.9  | 8       | 6    | 2.1                         | 6       |
| 4     | Rahata     | 44         | 50   | 4.4               | 5.0  | 14      | 7    | 0.6                         | 1       |
| 5     | Shrirampur | 23         | 51   | 2.3               | 5.1  | 4       | 8    | 2.8                         | 12      |
| 6     | Newasa     | 32         | 74   | 3.2               | 7.4  | 12      | 14   | 4.2                         | 14      |
| 7     | Shevgaon   | 29         | 53   | 2.9               | 5.3  | 7       | 11   | 2.4                         | 8       |
| 8     | Pathardi   | 24         | 51   | 2.4               | 5.1  | 5       | 10   | 2.7                         | 10      |
| 9     | Nagar      | 20         | 42   | 2.0               | 4.2  | 2       | 1    | 2.2                         | 7       |
| 10    | Rahuri     | 35         | 60   | 3.5               | 6.0  | 13      | 13   | 2.5                         | 9       |
| 11    | Parner     | 16         | 54   | 1.6               | 5.4  | 1       | 12   | 3.8                         | 13      |
| 12    | Shrigonda  | 23         | 50   | 2.3               | 5.0  | 3       | 9    | 2.7                         | 11      |
| 13    | Karjat     | 28         | 47   | 2.8               | 4.7  | 6       | 3    | 1.9                         | 5       |
| 14    | Jamkhed    | 31         | 43   | 3.1               | 4.3  | 10      | 2    | 1.3                         | 2       |

**Source:** Compiled by the researcher

**Agricultural Production Index- Ahmednagar District (1991)**  
(Kendall's Method)

| Agricultural Productivity/<br>HYV Seeds Technology | Rank co-efficient | No. of Tahsils | Name of Tahsils                                        |
|----------------------------------------------------|-------------------|----------------|--------------------------------------------------------|
| High Productivity                                  | Above - 35        | 02             | Rahata, Rahuri                                         |
| Moderate Productivity                              | 28 - 35           | 06             | Akole, Sangamner, Kopargaon, Newasa, Shevgaon, Jamkhed |
| Low Productivity                                   | 21 - 28           | 04             | Shrigonda, Karjat, Shrirampur, Pathardi                |
| Very Low Productivity                              | Below -21         | 02             | Nagar, Parner                                          |

**Source:** Compiled by the researcher

**Agricultural Production Index- Ahmednagar District (2011)**  
(Kendall's Method)

| Agricultural Productivity/<br>HYV Seeds Technology | Rank co-efficient | No. of Tahsils | Name of Tahsils                                                               |
|----------------------------------------------------|-------------------|----------------|-------------------------------------------------------------------------------|
| High Productivity                                  | Above -59         | 02             | Rahuri, Newasa                                                                |
| Moderate Productivity                              | 51 - 59           | 02             | Shevgaon, Parner                                                              |
| Low Productivity                                   | 43 -51            | 08             | Shrigonda, Karjat, Shrirampur, Akole, Sangamner, Kopargaon, Rahata , Pathardi |
| Very Low Productivity                              | Below -51         | 02             | Nagar, Jamkhed                                                                |

**Source:** Compiled by the researcher

**Measurement of Productivity by Yield Index Method:**

**1) High Agricultural Productivity:** High agricultural productivity has been observed In 1991 found two tahsils mainly Rahata and Rahuri tahsils and In 2011 found two tahsils observed as Rahuri and Newasa tahsils area due to the development of surface irrigation resulted into high area under sugarcane cultivation and development of agro-based industries like sugar industries and major area of the cultivated in this tract is irrigated either by canal. This region are highly receptive to new agricultural innovations.

**2) Moderate Agricultural Productivity:** Moderate agricultural productivity has been observed In 1991 found six tahsils Akole, Sangamner, Kopargaon, Newasa, Shevgaon, Jamkhed and In 2011 two tahsils observed as Shevgaon, Parner area due to high fluctuations of water table have retarded the development of modern technology resulted in the low purchasing power of farmers and irrigation facilities the commercial farming is developed in these tahsils.

**3) Low Agricultural Productivity:** Low agricultural productivity has been observed In 1991 found four tahsils Shrigonda, Karjat, Shrirampur, Pathardi and In 2011 eight tahsils observed as Shrigonda, Karjat, Shrirampur, Akole, Sangamner, Kopargaon, Rahata , Pathardi area due to high fluctuations of water table have retarded the development of modern technology resulted in the low purchasing power of farmers and low development of surface irrigation lead to high cultivation of rainfed crops.

**4) Very Low Agricultural Productivity:** Very Low agricultural productivity has been observed In 1991 found two tahsils Nagar, Parner and In 2011 two tahsils observed as Nagar, Jamkhed area due to undulating topography, scanty rainfall, lack of irrigation facilities resulted in lagging the development of modern technology. and due to the adverse environmental conditions and lack of irrigation facilities.

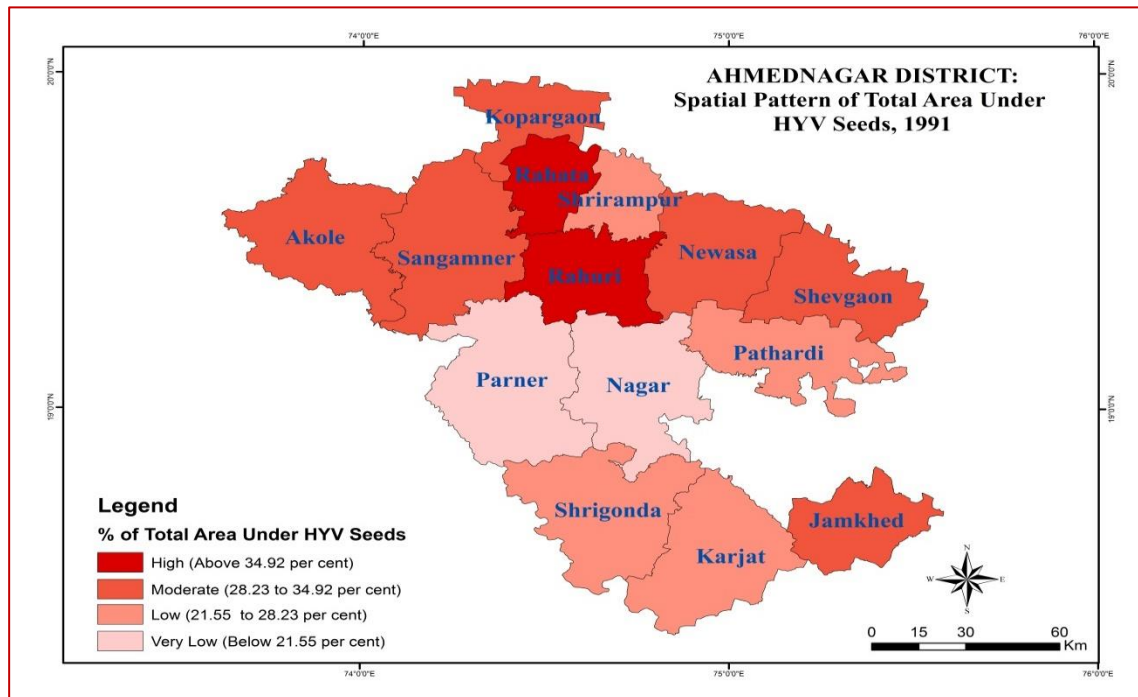


Fig.1.2

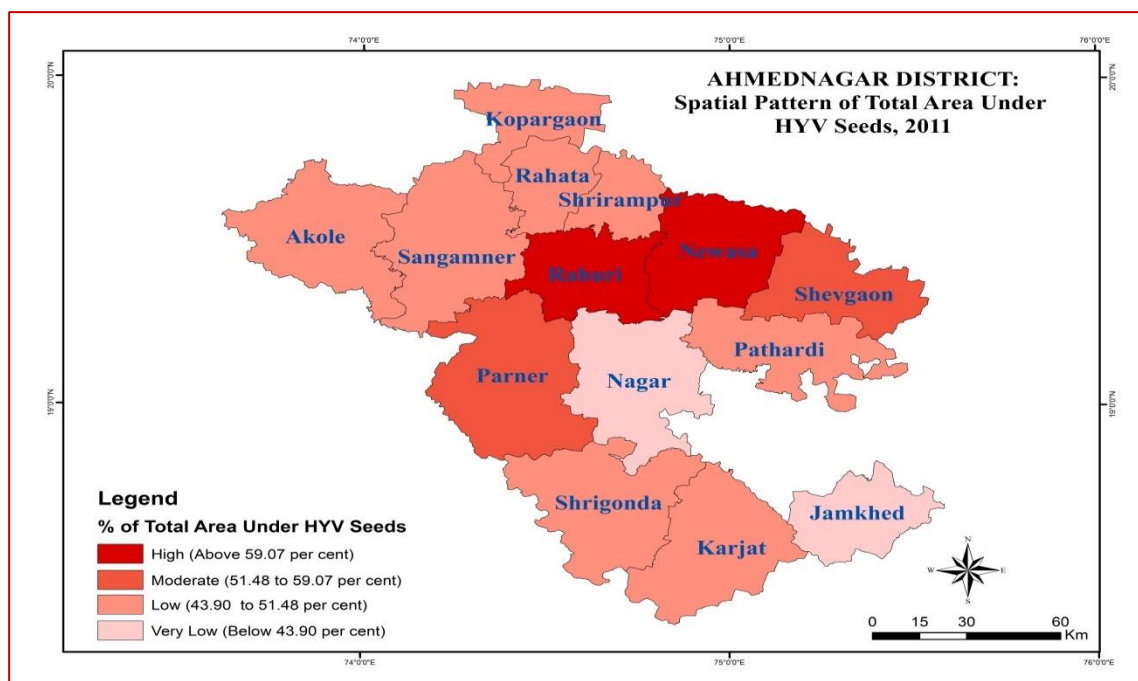


Fig.1.3

## B) Absolute Change in Level of HYV of Seeds technology

Table 1.3 indicates that the positive change in area under HYV of seeds to the total cultivated area of the district as a whole has 24.65 per cent, but spatial distribution varies from tahsil to tahsil.

The high positive change in area under HYV seeds to total cultivated area i.e. above 32.38 per cent is registered (fig.1.4) in Newasa and Parner tahsils due to the development of irrigation facilities and changes the attitudes of the farmers. The moderate positive change in area under HYV seeds i.e. from 23.25 to 32.38 is registered in Shrirampur, Shevgaon, Pathardi, Rahuri and Shrigonda tahsils.

The low positive change area in under HYV seeds i.e. ranging from 14.12 to 23.25 is recorded in Akole, Sangamner, Kopargaon, Nagar and Karjat tahsils. The very low positive change area in under HYV seeds i.e. below 14.12 is recorded in Rahata and Jamkhed tahsils due to the low rainfall and low development of irrigation facilities resulted in seasonal cropping pattern.

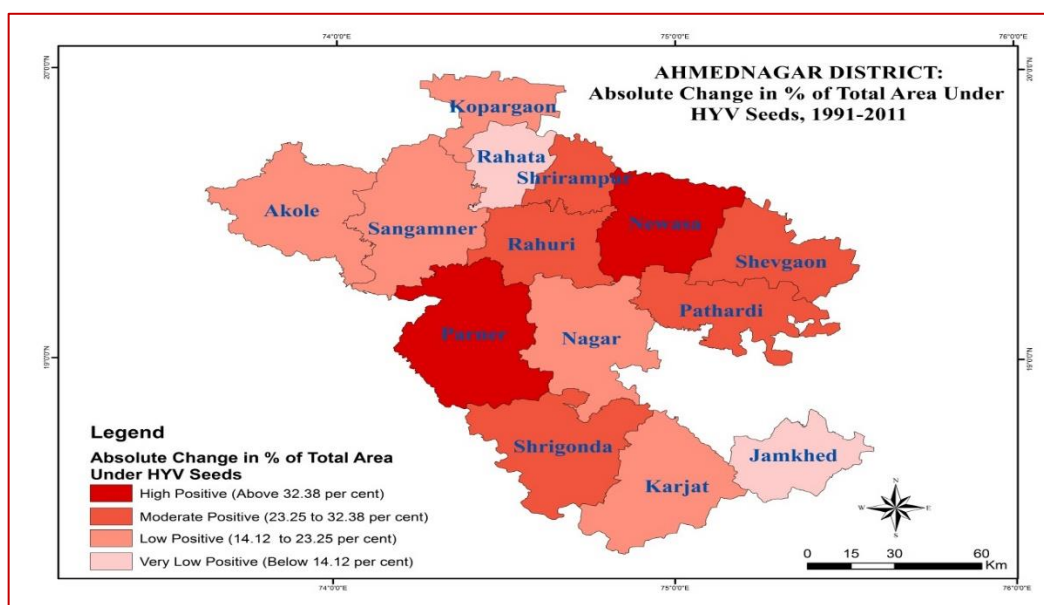


Fig.1.4

## C) Impact of HYV of Seeds technology on Agricultural Productivity.

The farmers in Ahmednagar district are awareness about the application of HYV of seeds for different crops. It has resulted that the high gap of the agricultural productivity between the contribution of HYVs of seeds and traditional seeds of the specific crops. Therefore, it would be valuable to study the impact of crop yield per unit of area.

The impact of HYV of wheat seeds on crop yields has been made here to compare the yields of N-59 variety of with traditional variety yield per hectare. It is a case study of the Rajuri village. The farmers have been devoted to N-59 variety of wheat. Similarly, the farmers have also been growing wheat by using traditional variety. The data affecting to per hectares yields of such variety are collected during the field visits and through the discussion with farmers similarly,

another sample crop of the study at farm level in Rajuri village (Rahata tahsil) is also conducted by the researcher to assess differentiation between the per hectares yields of HYV seeds and traditional seeds of the Sugarcane of an advanced farmers. Previously they are growing traditional variety in the same field and data regarding yields as compared to the recently familiarized variety Co- 86032 of sugarcane.

### Conclusion

Agricultural productivity depends upon the use of the quality of seeds. All other inputs like fertilizers, pesticide, and improved seeds, modern implements will go for nothing unless complemented by improved and quality of seeds. The district as a whole has 26.87 per cent area under HYVs of seeds to the total cultivated area in 1991, it is increased up to 51.52 per cent in 2011. The high proportion of area under HYV of seeds was recorded in Rahata and Rahuri tahsils in 1991 and Newasa and Rahuri tahsils in 2011 due to the extensive development surface irrigation resulted into substantial income from sugarcane farming leads to increasing the spread of agriculture implement technology. The very low proportion of area under HYV of seeds was found in Nagar and Parner tahsils in 1991 and Nagar and Jamkhed tahsils in 2011. Because of rugged topography, high variation in rainfall resulted in high fluctuations of the water table has retarded the development of modern technology resulted in the low purchasing power of farmers.

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