



## SPATIO-TEMPORAL CHANGES IN CROPPING PATTERN IN JALGAON DISTRICT, MAHARASHTRA

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### Introduction:

The transformation of cropping pattern is related to the use to which land is put in Jalgaon district at a given period of time. Land use study aims at explaining the constant interaction between available land resources on the one hand and human needs and efforts on the other. The competition between various types of uses is the result of scarcity of land. Some lands are better than others for specific use depending mostly on the physical characteristics of land which are suitable for a particular use it is related. Agriculture in Jalgaon district is mostly of intensive subsistence type. Cereals, pulses, cotton and oilseeds etc. are grown for the market validating their classification as commercial crops. There are two main cropping seasons, Kharif and Rabi. The kharif crops are sown in the monsoon and harvested in September-October. The rabi crops are sown in October-November and harvested in February-March. There are some crops like jowar and cotton which are grown in both the seasons. The study of extent of overall transformation in the combinations of crops in space and time is at the Tehsil level.

### Objective:

The main objective of the paper is to evaluate changes in cropping pattern in Jalgaon district. Database and methodology

The secondary data have been collected from various published reports of Jalgaon district for 1991 and 2011 to analyse the cropping pattern. Simple statistical techniques (percentages and averages) are used to analyse the changing trend in cropping pattern. For calculating transformation, the data of 1991 and 2011 are compared. For this, the data of the year 1991 is considered as base, i.e. 100 percent. The increase and decrease occurred in the year 2011 is calculated in percentage. The tables and maps are prepared according to the given information and explained thoroughly.

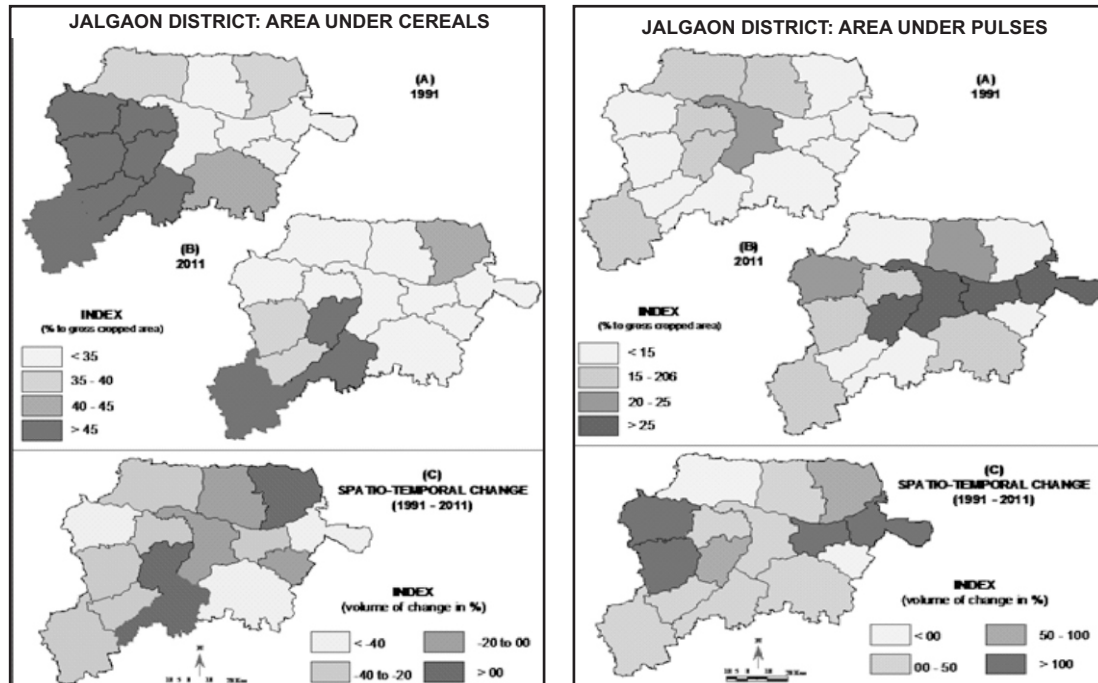
### Study area:

Jalgaon district is located in northern part of Maharashtra lies between 20° 15' 30" to 21° 25' North latitude and 74° 45' 30" to 76° 17' 51" East longitude. Area of Jalgaon district is 11765 Sq Km. It is divided into fifteen Tehsil and 1480 villages. The east-west extent of the district is 120 Km. Jalgaon district lies on the northern border of Maharashtra as well as in Tapi valley of northern Deccan trap. The length of Tapi river in the district is 130 Km. Jalgaon district situated on the Deccan plateau of North Maharashtra. Because of its different physical characteristic it differs from other districts of Maharashtra. Satpuda ranges are present at the northern side of Jalgaon district. The boundary of North and North-East side of district is connected with the state border of Madhya Pradesh state. The Aner river separates Jalgaon district from Dhule till its junction with the Tapi. At the east and south-west a range of low hills and some streams without any marked natural boundary, separates Jalgaon from the Bhuldhana district of Vidarbha. Southern border marked by Ajanta, Satmal Chundor ranges separates Jalgaon district from Aurangabad and Jalna districts of Marathwada, Nasik district at the west of Jalgaon. Panzara River being the only natural feature demarcating western border.

**Table 1: Jalgaon District: Spatio-temporal change in area under Cereals, Pulses, Oilseed and Cotton to Gross Cropped Area (1991-2011):**

| Sr. No.                 | Tehsils      | Cereals                 |              |               | Pulses                  |              |              | Oilseeds                |             |               | Cotton                  |              |              |
|-------------------------|--------------|-------------------------|--------------|---------------|-------------------------|--------------|--------------|-------------------------|-------------|---------------|-------------------------|--------------|--------------|
|                         |              | % to gross cropped area |              | Change in %   | % to gross cropped area |              | Change in %  | % to gross cropped area |             | Change in %   | % to gross cropped area |              | Change in %  |
|                         |              | 1991                    | 2011         |               | 1991                    | 2011         |              | 1991                    | 2011        |               | 1991                    | 2011         |              |
| 1                       | Chopda       | 39.68                   | 31.18        | 21.44         | 19.00                   | 13.45        | -29.23       | 6.80                    | 7.52        | 10.53         | 29.62                   | 40.81        | 37.79        |
| 2                       | Yawal        | 31.47                   | 30.54        | -2.96         | 18.86                   | 20.21        | 7.13         | 13.55                   | 4.72        | -65.20        | 19.66                   | 28.89        | 46.96        |
| 3                       | Raver        | 36.27                   | 43.12        | 18.88         | 9.25                    | 14.53        | 57.04        | 5.11                    | 2.64        | -48.27        | 19.09                   | 18.65        | -2.30        |
| 4                       | Muktainagar  | 31.07                   | 17.60        | -43.35        | 12.29                   | 28.14        | 128.93       | 4.46                    | 2.31        | -48.17        | 41.13                   | 40.14        | -2.39        |
| 5                       | Bodvad       | 34.21                   | 32.46        | -5.11         | 12.96                   | 11.84        | -8.62        | 24.21                   | 2.02        | -91.66        | 17.40                   | 49.30        | 183.35       |
| 6                       | Bhusawal     | 34.21                   | 24.25        | -29.12        | 12.96                   | 26.89        | 107.49       | 24.21                   | 4.50        | -81.41        | 17.40                   | 36.01        | 106.98       |
| 7                       | Jalgaon      | 33.15                   | 32.00        | -3.47         | 20.99                   | 26.27        | 25.12        | 24.54                   | 2.68        | -89.07        | 16.19                   | 33.23        | 105.26       |
| 8                       | Erandol      | 47.71                   | 53.31        | 11.73         | 15.98                   | 25.52        | 59.71        | 11.43                   | 6.95        | -39.19        | 20.24                   | 4.70         | -76.76       |
| 9                       | Dharangaon   | 47.71                   | 30.64        | -35.78        | 15.98                   | 19.71        | 23.31        | 11.43                   | 5.10        | -55.33        | 20.24                   | 41.62        | 105.65       |
| 10                      | Amalner      | 45.41                   | 25.10        | -44.72        | 10.36                   | 24.14        | 133.12       | 15.81                   | 10.55       | -33.25        | 24.20                   | 37.50        | 54.97        |
| 11                      | Parola       | 56.39                   | 37.82        | -32.92        | 7.38                    | 16.17        | 119.16       | 14.39                   | 5.98        | -58.48        | 18.29                   | 33.23        | 81.72        |
| 12                      | Bhadgaon     | 54.62                   | 36.71        | -32.80        | 9.49                    | 11.74        | 23.71        | 8.77                    | 2.41        | -72.52        | 16.95                   | 33.03        | 94.85        |
| 13                      | Chalisingaon | 66.17                   | 52.65        | -20.43        | 15.19                   | 16.27        | 7.06         | 12.24                   | 4.51        | -63.19        | 2.01                    | 18.89        | 838.96       |
| 14                      | Pachora      | 47.67                   | 58.19        | 22.07         | 9.16                    | 13.58        | 48.20        | 14.22                   | 4.12        | -71.06        | 24.05                   | 20.81        | -13.48       |
| 15                      | Jamner       | 40.45                   | 2.75         | -93.21        | 12.63                   | 18.28        | 44.76        | 16.47                   | 6.13        | -62.80        | 27.03                   | 69.50        | 157.13       |
| <b>Jalgaon District</b> |              | <b>44.15</b>            | <b>33.61</b> | <b>-23.86</b> | <b>13.69</b>            | <b>18.89</b> | <b>38.04</b> | <b>13.68</b>            | <b>5.08</b> | <b>-62.85</b> | <b>20.64</b>            | <b>34.26</b> | <b>65.98</b> |

Source: Socio-economic Abstracts of Jalgaon District, 1991 - 2011



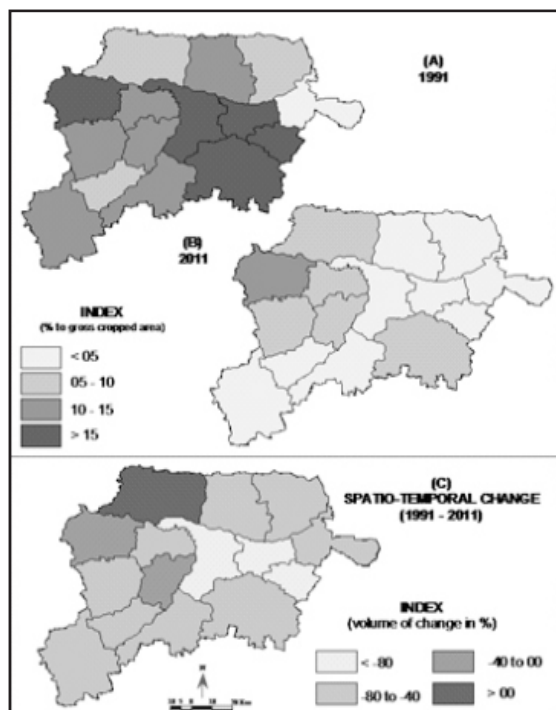


Fig. 3: Map for Oil Seeds

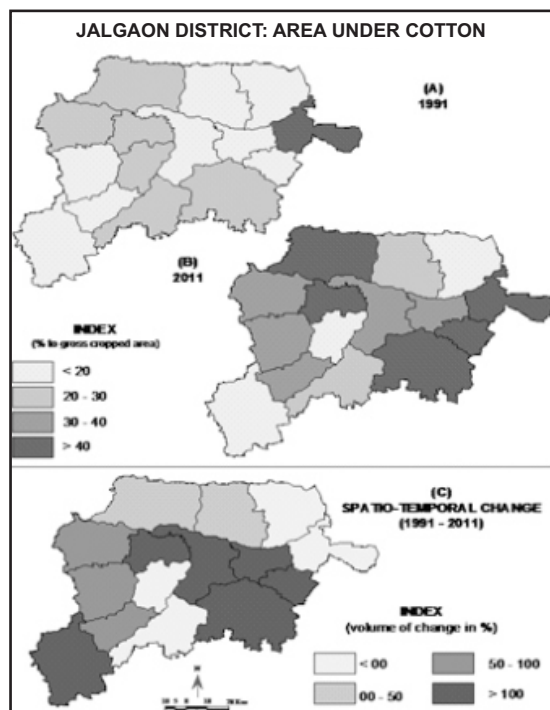


Fig. 4: Map for Cotton

Percentage Change in Proportion of Area Under Cereals to Gross Cropped Area (1991-2011):

Since the study is based on selected food crops like jowar, bajara, wheat, maize and rice, they are together termed as cereals. The proportion of area under cereals was 44.15 percent in 1991. In fifteen tehsils the area under cereals was between 31.07 percent to 66.17 percent. The proportion of area under cereals more than 45.00 percent in Erandol, Dharangaon, Amalner, Parola, Bhadgaon, Chalisgaon and Pachora tehsils and 40.45 percent in Jamner tehsil. The proportion of area under food crops 35.00 to 40.00 percent in Chopda and Raver tehsils, while remaining tehsils like Yawal, Muktainagar, Bodvad, Bhusawal and Jalgaon below the 35.00 percent. The proportion of area under cereals generally increases from the north-east to south-west in the study region.

Cereals occupy the most important portion of food crops in Jalgaon district. About 33.61 percent area of the district was occupied by the food cropped in 2011. The proportion of cereals were higher in Erandol, Chalisgaon and Pachora tehsils more than 45.00 percent respectively, and in Raver tehsil 43.12 percent. The proportion of Parola and Bhadgaon tehsils were 37.82 and 36.71 percent respectively, while lower proportion of cereals was found in Chopda, Yawal, Muktainagar, Bodvad, Bhusawal, Jalgaon, Dharangaon, Amalner and Jamner thesils below 35.00 percent.

However, the area under cereals is continuously decreasing from 1991 (44.15 percent) to 2011 (33.61 percent). During the last two decades, the percentage change shows decline of 23.86 percent in the proportion of area under cereals to total gross cropped area in the study region. It is due to increase in irrigation facilities most of its area is diverted to more cash crops. The proportion of cereals increase in Raver, Erandol and Pachora tehsils from 11.73 percent to 22.07 percent in the study period. On the contrary, the proportion of area under cotton has decreased in this tehsils. The percentage decline ranges between 2.96 percent to 93.21 percent. The higher decline in proportion of area under

cereals is found in Muktainagar, Amalner and Jamner tehsils. Here the decline is more than 40.00 percent. The proportion of cereals decline from 20.00 percent to 40.00 percent, is in Chopda, Bhusawal, Dharangaon, Parola, Bhadgaon and Chalisgaon tehsils. In the remaining part of the study region, Yawal, Bodvad and Jalgaon the decline in area under cereals is below 20.00 percent. This indicates that the cropping pattern of cereals is gradually changing. The tendency of the farmers is towards growing those crops which can benefit them in terms of cash.

**Percentage change in proportion of Area under pulses to Gross Cropped Area (1991-2011):**

Pulses is an important part of the daily food needed to the rural people. These are the major source of proteins. Pulses like Moog, Moth, Gram, Blackgram, Tur, Chawali etc. are cultivated in the region under study. The various pulses occupied 13.69 percent of the total gross cropped area in the study region. The central part of the study region consisting Jalgaon tehsil had the higher proportion (22.99 percent) of area under pulses. The proportion of 15.00 percent to 20.00 percent area under pulses were in Chopda, Yawal, Erandol, Dharangaon and Chalisgaon tehsils. The lower proportion below the 15.00 percent of such area was found in Raver, Muktainagar Bodvad, Bhusawal, Amalner, Parola, Bhadgaon, Pachora and Jamner tehsils

In Jalgaon district the proportion of area under pulses was 18.89 percent of the total gross cropped area in 2011. This proportion is higher (more than 25.00 percent) in Muktainagar, Bhusawal, Jalgaon and Erandol tehsils, while low proportion below 15.00 percent is observed in Chopda, Raver, Bodvad, Bhadgaon and Pachora tehsils. The remaining tehsils like Yawal and Amalner had their proportions from 20.00 percent to 25.00 percent and Dharangaon, Parola, Chalisgaon and Jamner tehsils had their proportion from 15.00 percent to 20.00 percent.

Pulses occupied 13.69 percent area of the total gross cropped area of Jalgaon district in 1991 Which increased up to 18.89 percent in year 2011. The study period shows percentage increase of 38.04 percent. About thirteen tehsils out of total number of fifteen tehsils in the district experienced increase in the proportion of area under pulses. Muktainagar, Bhusawal, Amalner and Parola tehsils suggest maximum change (more than 100.00 percent) in the study period. Pulses may be grown separately or in combination with other crops like cottan and bajara. Raver and Erandol tehsils have increased proportion of area under pulses (50.00 percent to 100.00 percent) during the last two decades. In the remaining part of the study area increase in area under pulses below the 50.00 percent, was in Yawal, Jalgaon, Dharangaon, Bhadgaon, Chalisgaon, Pachora and Jamner tehsils.

In Chopda and Bodvad tehsils, about 19.00 percent and 12.96 percent area of the total gross cropped area was occupied by various pulses in 1991 which decreased to 13.45 percent and 11.84 percent in 2011. The study period show decline of 29.23 percent and 8.62 percent. Growing competition with cotton and other crops, increase in irrigation and introduction of green revolution technology have resulted in diverting some of the area from pulses to other crops. In this tehsils pulses were important crop in 1991 and continued to be 2011 with smaller decline.

**Percentage change in Proportion of Area Under Oilseeds to Gross Cropped Area (1991-2011)**

Oilseeds are also important in the agricultural economy of the district. Groundnut is mostly grown in the kharif season and also as a summer crop and Til is produced only in kharif season. Oilseeds production is found in all tehsils of the district. Apart from food grains this commercial crop is grown in district area separately and mixed with other crops. Oilseeds occupied 13.68 percent area of total gross cropped area in 1991. The proportion of area under oilseeds ranged from 4.46 percent to 24.54 percent. The proportion was more than 15.00 percent in Bodvad, Bhusawal, Jalgaon, Amalner and Jamner tehsils. The lower proportion of area below the 5.00 percent under this crop were found in Muktainagar tehsil. The proportion of Yawal, Erandol, Dharangaon, Parola, Chalisgaon and Pachora tehsils area under oilseeds was 10.00 percent to 15.00 percent. The remaining tehsils like Chopda, Raver and Bhadgaon tehsils, oilseeds occupied area 5.00 percent to 10.00 percent.

In 2011, oilseeds account for a relatively smaller area coverage i.e. 5.08 percent in the study region. The higher proportion of (10.55 percent) of area under oilseeds was concentrated in the western part like Amalner tehsil, while lower proportion is found on Yawal, Raver, Muktainagar, Bodvad, Bhusawal, Jalgaon, Bhadgaon, Chalisgaon and Pachora tehsils. In these tehsils farmers have diverted themselves towards the cultivation of cotton and others crops, therefore, decline is observed in proportion of area under oilseeds. In remaining tehsils the proportion of area under oilseeds was 5.00 percent to 10.00 percent in Chopda, Erandol, Dharangaon, Parola and Jamner tehsils.

Groundnut and Til are important oilseeds crops grown in the study region. Til is raised during kharif season and groundnut is produced in kharif as well as Rabi seasons. These are mostly grown for domestic consumption. Combined they accounted for 13.68 percent of the total gross cropped area of the district in 1991 which declined marginally to 5.08 percent in 2011. The last two decades have reported decline of 62.85 percent in the proportion of area under oilseed. Presently availability of irrigation facilities and improved as well as mechanized methods of cultivation has diverted farmers from oilseed cultivation towards cultivation of cotton and other crops.

Due to substantial positive change in its area during the study period the northeastern parts of the district like chopda tehsil have reported increase in the proportion of area under oilseeds. In this tehsil decrease is noticed in the proportion of area under pulses and cereals crops. About fourteen tehsils out of total number of fifteen tehsils in the district experienced decrease in the proportion of area under oilseeds. The tehsils like Erandol and Amalner decline below the 40.00 percent, while the higher proportion more than 80.00 percent decline in Bodvad, Bhusawal and Jalgaon tehsils. The remaining tehsils decline 40.00 percent to 80.00 percent like Yawal, Raver, Muktainagar, Dharangaon, Parola, Bhadgaon, Chalisgaon Pachora and Jamner have reported decline in the proportion of area under oilseeds. This decline ranges from 33.25 percent to 91.66 percent. The farmers from these tehsils are diverted towards cash crops like Cotton, fruits and vegetables.

**Percentage change in Proportion of Area Under Cotton to Gross cropped Area:**

Cotton is an important cash crop grown in the Jalgaon district. It is grown as a kharif crop on black cotton soil. Cash crop plays an important role the economy of the region. It was grown on 20.64 percent of the district in 1991. Cotton is mainly grown in the study region due to significant and favorable climatic conditions. The proportion of area under cotton ranges from 2.01 percent to 41.13 percent. The higher proportion is found in Muktainagar tehsil (41.13 percent), while the lower proportion (below the 20.00 percent) area under this crops is found in Yawal, Raver, Bodvad, Bhusawal, Jalgaon, Parola, Bhadgaon and Chalisgaon tehsils. In the remaining part of the region, the proportion is between 20.00 percent to 30.00 percent.

In 2011 the gross cropped area of cotton occupied 34.26 percent in the study region. The maximum area is under this crop in the study region in 2011. The overall proportion of the area under this crop ranges between 4.70 percent to 69.50 percent. However, the significantly higher proportion of the area under cotton is found in Chopda, Muktainagar, Bodvad, Dharangaon and Jamner tehsils more than 40.00 percent. The lower proportion below the 20.00 percent of such area was found in Raver, Erandol and Chalisgaon tehsils. In remaining tehsils proportion of area under cotton was 30.00 percent to 40.00 percent like Bhusawal, Jalgaon, Amalner, Parola and Bhadgaon tehsils, while 20.00 percent to 30.00 percent area under cotton is found in Yawal and Pachora tehsils.

Cotton is the most important cash crop grown in the Jalgaon district. The production of cash crops like cotton has changed the socio-economic conditions of people to some extent. Cotton continued to be the principal crop of the region during 1991 to 2011 covering 20.00 percent of the total cropped area in 1991. It was the major crop of the Jalgaon district. Its proportion increased to 34.26 percent in 2011. During the study period of 1991 to 2011 proportion of area under cotton had increased by 65.98 percent. After 1991, increase, however, associated with the implementation of Green

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Revolution Technology, introduce of high yielding varieties of this crop. In the study region including Bodvad, Bhusawal, Jalgaon, Dharangaon, Chalisgaon and Jamner tehsils proportion of area under cotton to total gross cropped area has increased by more than 100.00 percent. It is mainly due to black cotton soil, semi dry climate, extension of irrigation facilities during the period of 1991 to 2011. Moderate increase in area under cotton was found in western parts like Amalner, Parola and Bhadgaon tehsils. Low increase (below 50.00 percent) in area under cotton is a northwestern parts like Chopda and Yawal tehsils. The soil moisture condition of these tehsils have always been more suitable for Cotton culture but detrimental for the cultivation of other crops such as oil seeds, pulses fruits and vegetables. The Raver, Muktainagar, Erandol and Pachora tehsils have reported that decline in proportion during the last two decades. The rate of decline is 2.30 percent in Raver tehsil, 2.39 percent in Muktainagar tehsil, 76.76 percent in Erandol tehsil and 13.48 percent in Pachora tehsil, it may be due to strong competition with other crops.

#### **Conclusions**

1. During the entire time period 20 years from 1991 to 2011 the average gross cropped are increased and decreased all crops time to period of the district.
2. Cotton crops highly increased in total district.
3. Cereals crops have highly decreased day by day.
4. In every tehsil under total crops has increased and decreased.

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