

“A STUDY ON CROPPING INTENSITY INDEX AND IRRIGATION INTENSITY IN DISTRICT DEHRADUN”

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ABSTRACT:

This study presents a cropping intensity and irrigation intensity in Dehradun. The diversified nature of land use pattern, cropping intensity, irrigation intensity and cropping pattern of all blocks have increased the cropping intensity of the land. The present cropping intensity of 98.52 percent has registered decrease of only 18 percent since 1991-92. The net sown area decreased significantly, i.e., by about 22 percent, from 164.21 hundred hectares in 1991- 92 to 142.86 hundred hectares in 2013-14, whereas the cropping intensity decreased from 116 percent to 98 percent during the same period. The net irrigated area was 81.92 hundred hectares in 2013-14, whereas the irrigation intensity increased from 20.52 percent in year 1991-92 to 57.34 percent in year 2013-14 during the same period.

Keywords: - Cropping Intensity, Irrigation Intensity, Agriculture.

I. INTRODUCTION:

Cropping intensity plays an irreplaceable role in agricultural growth. The higher the cropping intensity more the usage of land for agricultural purposes due to expansion of net sown area beyond saturation level crops are getting exhausted. the problem is solved by doing multiple cropping. From independence of India till date the agricultural growth is the outcome of efforts done to increase availability of seed of high quality and yield varieties fertilizers pesticides and other farm equipments. The main reason for agricultural growth is the use of modern crop varieties and high uses of investment. The land use has decreased considerably and productivity has increased due to better facilities

Cropping intensity plays an unreplacible role in the agricultural growth of any region. Higher the cropping intensity more the usages of land for agricultural purpose. The scope for expanding net sown area having already reached a saturation level and potential for raising for yield nearly exhausted in many crops and regions, stepping up of incidence multiple cropping will be necessary to augment agricultural production. The agricultural growth that India has experienced since independence is an outcome of efforts to ensure availability and use of high-quality seeds of high-yielding varieties, fertilizers, irrigation, pesticides, farm machinery and equipment; and agricultural credit. The major sources of agricultural growth during this period were the spread of modern crop.

varieties, intensification of input use and investments leading to expansion in the irrigated area. The contribution of increased land area under agricultural production has declined over time and increases in production in the past two decades have been almost entirely due to increased productivity. Cropping intensity on a farm is found by dividing the gross area sown by the net area sown in any crop year, and the multiplying is by 100. This measure gives us an index of the extent of multiple cropping taking place on a farm. Intensity of irrigation is defined as the percentage of net irrigated area to the net sown area.

The Area

Dehradun is the most important and capital district of the newly formed State of Uttarakhand comprises two distinct tracts-the vally part called Doon Vally and the hilly tract of Chakarata tehsil in the north west also known as Jaunsar Baber. The valley itself is composed of two sub valleys, the pachhawa doon sloping down to the Yamuna towards the south west, and the other called Parva Doon towards the ganga in the south- east. The district is located between $29^{\circ} 56'$ to $30^{\circ} 57'$ north latitude and $77^{\circ} 35'$ east to $78^{\circ} 23'$ east longitudes. The total area of the district is 3088sq kilometers. It is bounded in the North and North East by Uttarkashi district, in the east by the district of Tehri Garhwal and in the South by the Saharanpur district of Utter Pradesh whereas Southern boundary surrounded by Haridwar District. Its western boundary adjoins the Sirmour District of Himachal Pradesh.

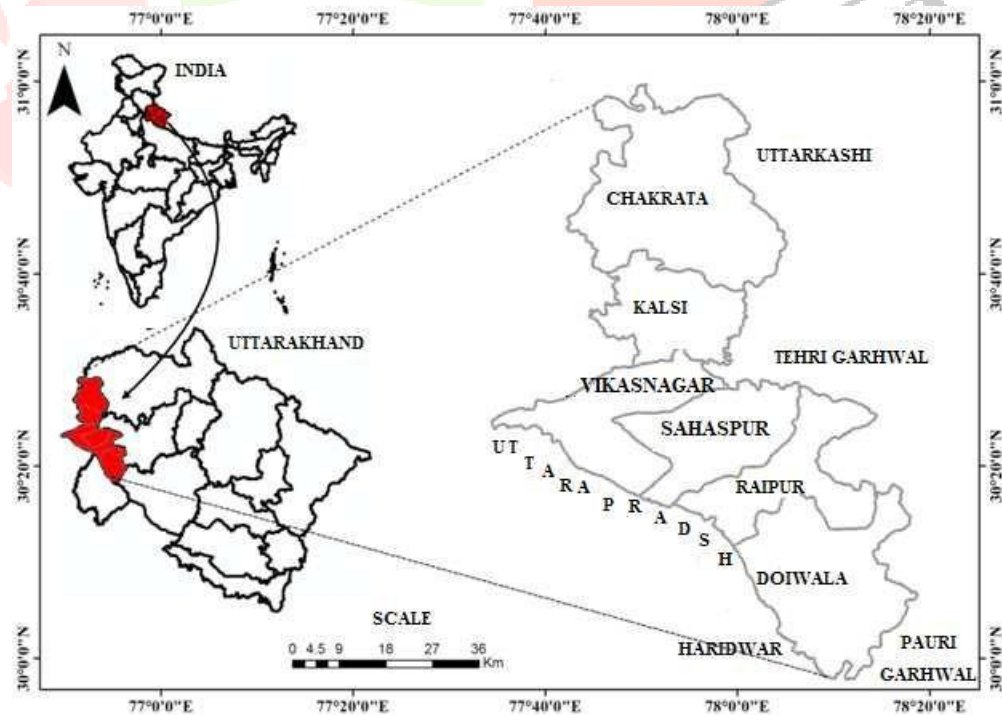


Fig: The Study Area (District Dehradun)

- **Objectives of study:-**

1. To identify Cropping Intensity in Dehradun.
2. To study the Blocks wise Cropping Intensity in Dehradun.
3. To identify Irrigation Intensity in Dehradun.

- **Review of Literature: -**

Valipour (2015), He studied what is The Tendency of Cultivate Plants for Designing Cropping Intensity in Irrigated Area. The study shows indicate that attention to only commercial goals should be reduced, trial and error policies should be avoided and exert comments be applied to the irrigation systems for any crop to achieve sustainable agriculture in future. To identify major and effective variations on land for cropping intensity for investment plans. **Saka (2011)**, He has studied the Determinants of Land Use Intensity among Food Crop Farmers in South Western Nigera. The study examines the structure of land use intensification in food crop production in towards determining its drivers and concordance with the condition for sustainable intensification. Researcher concludes that evidence of increasing pressure on land that is characterized by increased frequency of cultivation of farmland high cropping intensity and prevalence of high land use intensity in food crop production in the study area however the condition under which this took place fell short of what was advanced for sustainable growth through intensification. **Heller, Rhemtulla, Lele, Kalacska, Badiger, Sengupta and Ramankutty (2013)**, They have examined mapping crop types, irrigated areas, and cropping intensities in heterogeneous landscapes of southern India using multi-temporal medium resolution imagery: implications for assessing water use in agriculture. The study shows that higher estimates of total and irrigated cropland than the previous single- imagery studies and census data revealing the high uncertainty in crop estimates in the region.

II) RESEARCH METHODOLOGY AND DATABASE:

For accomplishing the objectives of the study secondary data were collected. The necessary secondary data for completing the investigation will be collected mainly from published sources in academic libraries, records, books and journals, articles, government reports, websites, newspapers, daily archives, economy survey government of India, socio-economic survey report of India secondary data will be collected to obtain the background material from the persons knowledgeable in different aspect of the topics as also the academicians.

The researcher will use the different farm efficiency index such as, cropping intensity index, irrigation intensity etc.

- $Cropping\ Intensity\ Index = \frac{Gross\ Cropped\ Area}{Net\ Sown\ Area} * 100$
- $Irrigation\ Intensity = \frac{Net\ Irrigated\ Area}{Net\ Sown\ Area} * 100$

Researcher will use the important statistical techniques to analyze and interpret the data.

III) RESULTS AND DISCUSSION:

1) Cropping Intensity in Dehradun:

Cropping intensity in Dehradun:-

In mathematical way, crop intensity is defined as the ratio of gross cropped area to net cropped area. Agriculture can be made more productive if we bring more land under cultivation or increase the crop intensity by using suitable methods or we can use both. Since the availability of land is limited therefore intensive cultivation could be the best option for more agricultural production. Improve seed fertilizers and technology is the important part in cropping.

Cropping intensity is expressed as the ratio of gross cropped area to net cropped area. Agricultural production can be increased either by bringing more and more land under cultivation or by increasing the cropping intensity and productivity of land or combination of both. As the availability of land is fixed, intensive cultivation is more suitable to increase production. Adoption of improved seeds, fertilizers and mechanization are the important factors which increase cropping intensity. There are only two ways to satisfy the increasing food and other demands of the country's rising population either expanding the net area under cultivation or intensifying cropping over the existing area.

Table No. 1 Cropping Intensity in Dehradun

| Area in Thousand Hectares | | | | |
|---------------------------|-----------|---------------|--------------------|--------------------|
| Sr. No. | Year | Net Sown Area | Total Cropped Area | Cropping Intensity |
| 1 | 1991 - 92 | 164.21 | 191.6 | 116.67 |
| 2 | 2005 - 06 | 156.27 | 147.76 | 94.55 |
| 3 | 2013 - 14 | 142.86 | 140.75 | 98.52 |

Source; - Source: District Statistical handbook, Dehradun, Year 1993, Year 2007, Year 2015.

Table 1 reveals that the cropping intensity of Dehradun from 1991-92 to 2013-14. It shows that continuously decreasing cropping intensity in Dehradun. In the year 1991-92 net sown area is 116.67 thousand hectares and gross cropped area is 191.6 thousand hectares and 2013-14 in year net sown area is 142.86 thousand hectares and gross cropped area is 140.75.thousand hectares decreasing trend year by year. In the year 1991-92 the cropping intensity is 116.67 become decreasing its continuously i.e. 98.52 in 2013-14. Cropping intensity is taken as the ratio of the gross area under all crops grown on the farm over the crop year.

Table No. 2 Blocks Wise Cropping Intensity in Dehradun

| Sr.No. | Blocks | 1991-92 | 2005-06 | 2013-14 |
|--------|------------------------|---------|---------|---------|
| 1 | Chakrata | 153.91 | 114.32 | 92.36 |
| 2 | Kalsi | 137.81 | 119.70 | 120.70 |
| 3 | Vikasnagar | 117.29 | 95.12 | 100.35 |
| 4 | Sahaspur | 128.71 | 92.48 | 114.27 |
| 5 | Raipur | 126.96 | 82.89 | 121.78 |
| 6 | Doiwala | 88.82 | 107.60 | 76.10 |
| | Total District. | 116.67 | 94.55 | 98.52 |

Source: - Source: District Statistical handbook, Dehradun, Year 1993, Year 2007, Year 2015

Table2 indicate that blocks wise cropping intensity in Dehradun form 1991-92 to 2013-14. The table shows

that cropping intensity is higher in 1991-92 in Chakrata, Kalsi, Sahaspur, Raipur, Vikasnagar, and Doiwala for i.e (153.91), (137.81), (128.71), (126.96), (117.29), (88.82) but the sharing of percentage change in the year of 2013-14. Raipur following by Kalsi, Sahaspur, Vikasnagar, Chakrata and Doiwala, (121.78), (120.70), (114.27), (100.35), (92.36), (76.10).

The high cropping intensity in the Raipur block and lowest intensity in Doiwala block.

The cropping intensity shows great spatial variation in Dehradun, in various years they are change in year by year most of the land of plain blocks converted in human settlement .

2) Irrigation Intensity of Dehradun

Irrigation intensity in Dehradun:-

For the requirement of agricultural development, irrigation plays a major role in it. Irrigation is a traditional method for promoting agricultural development. The reason is that in the present due to the use of modern agricultural equipments, fertilizers, pesticides and hybrid seeds the irrigation intensity is also increasing and keep the balance with high productivity. By use of natural method types only results in low yield or bad quality crops and from that we can say that irrigation affects the level of agricultural production.

Irrigation is an artificial substitute of rainfall to overcome the water need of crops. Irrigation is used as a protective measure and a supplement against the failure of crops in different parts of world, which is the best method to overcome the obstacle put up by a regular, uncertain and an evenly distributed rainfall in an uncertain time. Irrigation intensity is mathematically defined by the percentage ratio between the net areas irrigated to net area sown.

Among the requirement of agricultural development, irrigation is indispensable for agricultural production. Irrigation is an ancient approach to promoting agricultural development. It is so because in the present day modernized agricultural pattern, the increasing use of modern agricultural inputs and marking the use of various chemicals for soil conservation more effective, require more water for irrigation. The less use of agricultural inputs results only in a low level of production. Thus, we see that irrigation affects the level of agricultural production. Recent advances in agricultural technology have further enhanced the importance of irrigation as it is pre-requisite for the adoption

of these technologies.

Irrigation is essentially the artificial application of water to overcome deficiencies in rainfall for growing crops. Irrigation as a protective measure to supplement rainfall and precaution against the failure of crops is always practiced in the various parts of the world. Irrigation is very vital to overcoming the basic problems of the agriculture. Irregular, uncertain and unevenly distributed rainfall in time amount and space is not sufficient for growing certain crops. These conditions make irrigation essential and indispensable for the successful crop production. The intensity of irrigation means the percentage ratio between the net areas irrigated to net area sown.

Table No. 3 Irrigation Intensity of Dehradun

Area in Thousand heaters

| Sr. No. | Year | Net Sown Area | Net Irrigated Area | Irrigation Intensity |
|---------|---------|---------------|--------------------|----------------------|
| 1 | 1991-92 | 164.21 | 33.7 | 20.52 |
| 2 | 2005-06 | 156.27 | 46.36 | 29.66 |
| 3 | 2013-14 | 142.86 | 81.92 | 57.34 |

Source: - Source: District Statistical handbook, Dehradun, Year 1993, Year 2007, Year 2015.

Table 3 shows that the irrigation intensity of Dehradun from 1991-92 to 2013-14. During the study period irrigation intensity showing increasing trends. Irrigation has played an important role in raising the cropping intensity. Irrigation helps raise the cropping intensity by enabling rising, of crops during the dry season also. During the study period net sown area, net irrigated area and irrigation intensity showing increasing trends. The year 1991- 92 to 2013-14 net irrigated area becomes increasing its continuously i.e. 1991-92 in 33.7 thousand hectares to 2013-14 in 81.92 thousand hectares. A study cropping intensity and irrigation intensity reveals that irrigation played an important role in distribution of cropping intensity and irrigation intensity. In area of d irrigation facilities for increased their agricultural production and cropping intensity higher. Higher cropping intensity means that a higher portion of the net area is being cropped more than once during one agricultural year. This also implies higher productivity per unit of arable land during one agricultural year. Increase in cropping intensity, timeliness of operations and reduction in drudgery have been shown to be the needed incentives for farmers and farm workers to adopt modern methods of cultivation. The results revealed that the cropping intensity increased with increasing of effective irrigation potential as well as net irrigated area with the introduction of diversified crops during winter season subsequently grown with stored water. Finally in this study conclude that in area of irrigation facilities increased their cropping intensity and irrigation intensity is higher. It shows that higher cropping intensity in Punjab State is 190 and lower cropping intensity in Manipur state is 100 in India.

Conclusion:-

In recent researches, it is revealed that irrigation is the main part of cropping intensity and irrigation intensity. In areas of high irrigation and modern irrigation facilities the yield of crops are better than the other particular regions in an agricultural year. For farmers to adopt modern technology and methods of crops, the increase in cropping intensity and decrease in drudgery is important. The studies revealed that the cropping intensity with the help of higher irrigation intensity can grow crops in winters with stored water only. The final conclusion of this report tell us that due to high irrigation facilities the cropping and irrigation intensity increases which led to the increase of agricultural growth.

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