"IMPACT OF IRRIGATION DEVELOPMENT ON CROPPING INTENSITY IN NASHIK DISTRICT, MAHARASHTRA"

DR. SANJAY D. PAGAR

HOD & Assistant Professor, Department of Geography
MVP Samaj's Arts, Science & Commerce College, Ozar (Mig) Tal: Niphad, Dist: Nashik
(Affiliation: Savitribai Phule University, Pune)

ABSTRACT

Irrigation is the backbone of agriculture. Timely and adequate water supply is necessary for healthy agriculture. Irrigation plays an important role in agricultural development of the country. Agricultural production and productivity of cultivable land can be increased through irrigation. Irrigation provides water the crops are in need of water.

The main aim of the present paper is to study the irrigation development and its impact on cropping intensity in Nashik District of Maharashtra the 2008-09.The present study is based on the secondary source of data. The Tahsil has been taken as a unit for analysis the impact of irrigation growth on cropping intensity in the study area. The study has observed that during the study periods in 1960-61 only 4.52 percentage areas was under irrigation, which has increased up to 44.09 in 2008-09. It means during the span of forty eight years 39.57 percent area under irrigation is increased.s

Latest data available about tahsilwise area under irrigation and cropping Intensity shows that a region having good irrigation facilities helps to increased cropping intensity. The irrigation development in the western & northeastern part is low, where physical environment is unfavorable for irrigation development. Applying the modern methods of irrigation like drip and sprinkler will be useful to use water effectively for agriculture. In rainy season western part received good rainfall, but due to steep slope most of the water is drained into Arabian Sea, therefore this water can be arrest by constructing small dam and make some channels, through these channels water can be carried out towards the eastern and south parts of the study, where water scarcity is too much.

Keywords: Irrigation, Cropping Intensity, Agricultural Infrastructure, double cropping & Agricultural Productivity.

INTRODUCTION:

Irrigation is the backbone of agriculture. Timely and adequate water supply is necessary for healthy agriculture. Irrigation plays an important role in agricultural development of the country. Its influence on agricultural productivity and leads to develop the economy **(Kale & Patil., 2012)** in area where rainfall is plentiful and well-distributed over the year, there is no problems of water. But in the study region, rainfall in certain areas is very scanty as well as uncertain. Therefore artificial irrigation is requiring for the agricultural production and to expand the area under cultivation. Irrigation provides assured supply of water.

Irrigation plays important role in increase the cropping intensity and crop production. It also makes favourable condition to introduction of new technology and crop diversification of crops. Cropping Intensity is defined as an extent to which the net area sown has been cropped or resown in the one agricultural year. Irrigation is prime factors which controlled the cropping intensity. The flexibility in selecting appropriate crop pattern is also enhanced when irrigation facilities make water available in a controllable manner farm to the farmers throughout the year **(Kalaiselvi & Sundar, 2011).** Therefore study of irrigation development is important to increase the cropping intensity of agricultural region.

Irrigation efficiency in agriculture can be improved by adoption of modern methods of irrigation to achieve the goal of more crops per drop of water **(Dr.H.R.Gautam, 2015).**

STUDY AREA:

Nashik is one of the major agriculturally and industrially developed district in the North Maharashtra. It is situated partly in the Tapi basin and partly upper Godavari basin. It lies between 19° 33` to 20° 53` north latitude and 73° 15' to 75° 16' east Longitude ***(Nashik Gazetteer,1983)***. Nashik District has an area of 15,530 Sq.k.m. Nashik District had population 6,109,052 as per the 2011 census. Location of the study area is showed in Fig. No.1.

The district is divided into 15 tahsils, which consisting of 1930 villages. Nashik and Malegaon are two major Municipal Corporation and eight Nagar Parishad are located in the study region. The main system of hills is the sahyadries, which run north- south in the western portion of the district. In the extreme north is selbari range, which approximately forms and boundary between Nashik and Dhule district. Next is the Satmala range which runs right across district. Kalsubai range is located in the south part of the district. The district has two main rivers the Girna and the Godavari. The district is surrounded by Dhule district in the north, Jalgaon and Aurangabad districts in the east, Ahemadnager district in the south, and Thane district in the south- west and Gujarat state in the north- west.

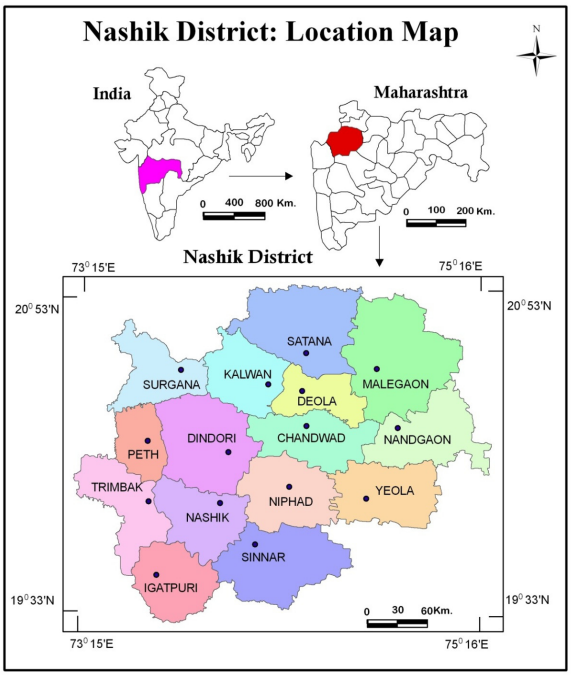

Fig. No.1

The climate of the district is generally dry except during the monsoon season. The average annual rainfall of the district as a whole is 1034.5mm. The rainfall in general decreases from west to east. The summer season is moderately hot and the temperature varies from 36° c to 43° c.

OBJECTIVES:

The main objectives of the present paper are as fallows.

1. To analysis the irrigation development in the study area.
2. To analysis the impact of irrigation on cropping intensity in the study area.
3. To highlight the problems of irrigation development and suggest proper remedies for minimized the intensity of problems of irrigation in the study region.

DATA BASE AND METHODOLOGY:

The present study is based secondary source of data. Secondary data obtained from socio-economic abstract of the Nashik district (1963-64, 1983-84, 2013), Census CD's 2011, District Gazetteers. The Tahsil has been taken as a unit for analysis of the cropping intensity and irrigation development in the study region. Some of the simple mathematics and statistical tools like percentage, average etc. have been used in the study. Data is processed and represented with the line graph, Choropleth map & point map by using GIS software.

To calculate the cropping intensity following formula is used.

$$C.I. = \frac{TCA}{NSA} * 100$$

Where, C.I. = Cropping Intensity
TCA= Total Cropped Area
NSA= Net Sown Area

RESULTS & DISCUSSION:

Irrigation Development: In area where rainfall is plentiful and well-distributed over the year, there is no problems of water. But in the study region, rainfall in certain areas is very scanty as well as uncertain. Therefore artificial irrigation is requiring for the agricultural production. In Nashik district only Darana (1916) dam was constructed before 1961.Few projects just was started to build and awareness about cash crops was not too much therefore area under irrigation and cash crops was very less during the year 1960-61.Now in the study region, there are 73 irrigation projects. Most of projects are located in the western part of the district.A study of data in Table No.1 indicates that area under irrigation is increased by 39.57 percentage during the 39 years. During the year 1980-81 to 2000-01, there was not too much increased in irrigated area but after then it was increased by 18.67 percentages within 20 years period.

TABLE NO.1: NASHIK DISTRICT: AREA UNDER IRRIGATION -1960-61 TO 2008-09

Sr. No.	Year	Irrigated Area (%)
1	1960-61	04.52
2	1970-71	12.43
3	1980-81	24.10
4	2000-01	25.42
5	2008-09	44.09

Compiled by the researcher, 2016

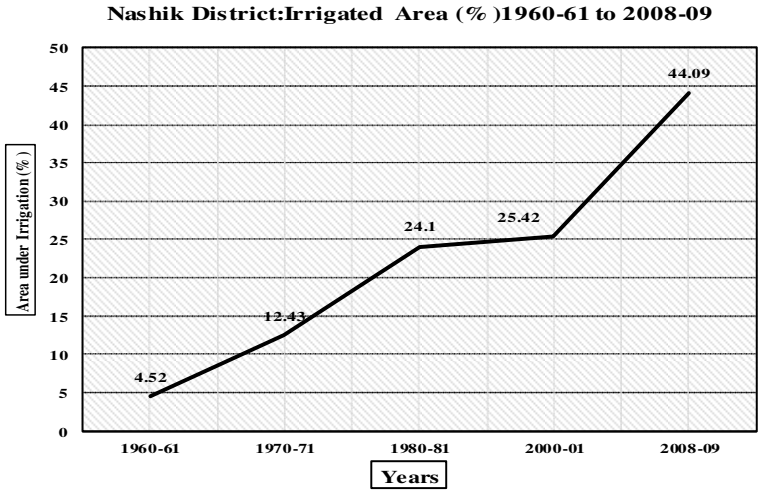

Fig.No.2

Cropping Intensity: Cropping Intensity is defined as an extent to which the net area sown has been cropped or resown in the one agricultural year. It is percentage ratio of total cropped area to the net sown area. It is used to define the land use efficiency and extent to which the sown area is resown. It reveals the efforts of man in extracting maximum output from a particular part of agricultural land by sowing more than once**.** It is used to define the land use efficiency and extent to which the sown area is resown.
In general level of cropping intensity is higher in area with higher percentage of net sown area irrigated. At some region it may be differ due to other factors which also impact of cropping intensity e.g. Climate, Capital, technological infrastructure etc. After using the formula, cropping intensity is calculated for year 2008-09 to each tahasil of the study area, which is indicated in Table No.2 and Fig.No.3.

TABLE NO.2.NASHIK DISTRICT: IRRIGATED AREA (HECT. & PERCENTAGE) & CROPPING INTENSITY-2008-09

Sr. No.	Name of Tahsils	NIA	TGCA	IA (%)	Net Sown Area (%)	Double Cropping Area (%)	Cropping Intensity
1	Surgana	2174	31510	6.90	98.96	1.04	101.06
2	Kalwan	39661	48546	81.70	96.55	3.45	103.57
3	Deola	28205	36033	78.28	82.07	17.93	121.84
4	Satana	31999	79884	40.06	91.99	8.01	108.71
5	Malegaon	9215	68274	13.50	96.34	3.66	103.80
6	Nandgaon	16631	36833	45.15	93.21	6.79	107.28
7	Chandwad	17264	59671	28.93	96.49	3.51	103.64
8	Dindori	41815	70020	59.72	88.82	11.18	112.59
9	Peth	8988	33514	26.82	98.70	1.30	101.32
10	Trimbak	0	38629	0.00	99.35	0.65	100.65
11	Nashik	21978	23777	92.43	79.65	20.35	125.55
12	Igatpuri	9948	40160	24.77	94.80	5.20	105.48
13	Sinnar	56623	64446	87.86	84.45	15.55	118.41
14	Niphad	10420	61410	16.97	79.24	20.76	126.20
15	Yeola	42601	72825	58.50	73.35	26.65	136.34
Total Area		**337522**	**765532**	**44.09**	**89.60**	**10.40**	**111.60**

Source: Nashik District Abstract-2013.
N.B= NIA-Net Irrigated Area, TGCA-Total Gross Crops Area, IA-Irrigated Area.

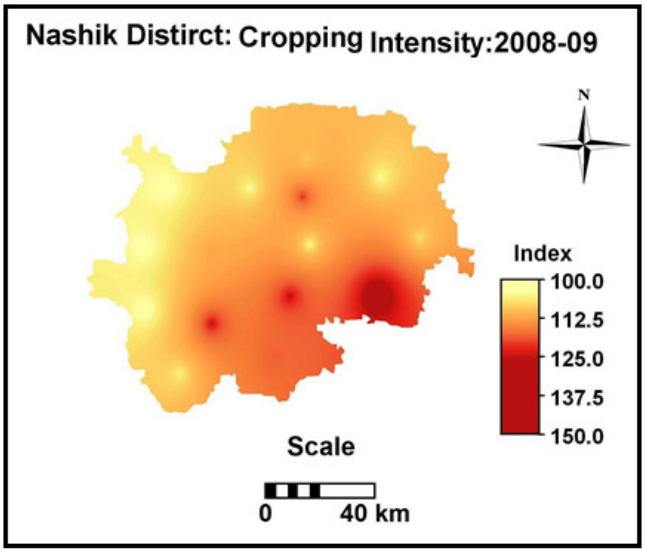

FIG.NO.3

SPATIAL PATTERN AND LEVEL OF CROPPING INTENSITY:

On the basics of cropping intensity, the tahasil of the study region are grouped into three categories, which are shown in Table No.3.

TABLE NO.3: NASHIK DISTRICT: CROPPING INTENSITY-2008-09

Sr.	Irrigation Intensity (%)	Tahsils-2008-09
1	High (120 <)	Nashik , Niphad. Kalwan, Yeola and Deola
2	Moderate (110-120)	Satana and Dindori
3	Low (110 >)	Sinnar,Igatpuri. Chandwad, Trimbak, Nandgaon, Malegaon, Peth & Surgana

Source: Compiled by Researcher, 2016

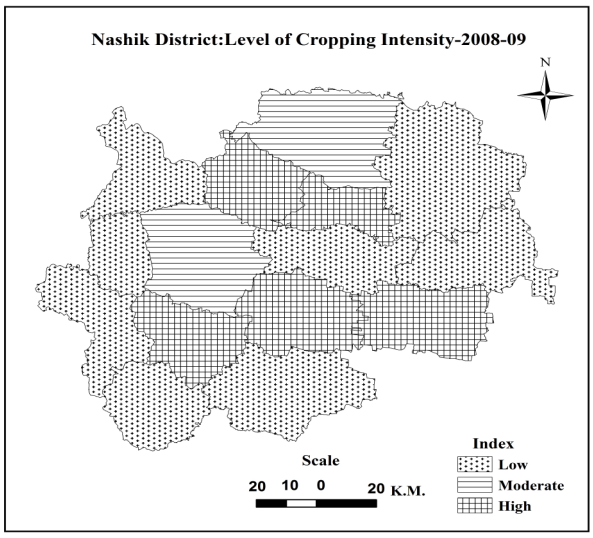

Fig.No.4

Table No.2 and 3 indicates that generally cropping intensity is high in those tahsils where percentage of irrigation is high. The cropping intensity of the study are was 111.60 in 2008-09.

Area of High Cropping Intensity:

Areas, which have cropping intensity more than 120 percent, are included in these categories. Higher cropping intensity means that higher portion of the net sown area is being cropped more than once during one agricultural year. It is observed from Table No.2 and Fig No.4 that during the year 2008-09 the cropping intensity was found high in Kalwan, Niphad, Deola Nashik and Yeola tahasils. In these areas irrigation facilities and agricultural infrastructure are well developed, which is helps to increases the cropping intensity of these areas.

Area of Moderate Cropping Intensity:

The area, which has the cropping intensity range from 110 to 120 percentage are included in this category. Satana and Dindori tahasils are included in this category. In this region moderate cropping intensity is found due to irrigation and due availability of irrigation and other agricultural infrastructure. Mostly, Dindori tahsil is developing in producing various cash crops and use of greenhouse also increasing during last 10 years in the various villages of the tahsils.

Area of Low Cropping Intensity:

Areas, which have cropping intensity less than 110 percent are included in this category. The low cropping intensity was found Sinnar, Igatpuri. Chandwad, Trimbak, Nandgaon, Malegaon, Peth & Surgana. Whereas irrigation facilities are not too much developed and local physical environment also not too much favourable for agricultural development. Western parts of the study region have rugged topography and irrigation facilities are not well developed therefore cropping intensity is low in these area.

CONCLUSION:

1. It is concluded that the irrigation development is not uniform .There is a regional disparity in cropping intensity at tahsil level in the study region.
2. The irrigation development in the western & northeastern part of the Nashik district is low, where physical environment is unfavorable for irrigation development.
3. Cropping intensity was found high in Kalwan, Niphad, Deola Nashik and Yeola tahasils. In these areas irrigation facilities and agricultural infrastructure are well developed, which helps to increases the cropping intensity of theses area
4. The low cropping intensity was found in Sinnar, Igatpuri. Chandwad, Trimbak, Nandgaon, Malegaon, Peth & Surgana. Whereas irrigation facilities are developed and local physical environment is also not too much favourable for agricultural development.
5. Irrigation is one important factor, which controlled the cropping intensity but other factors like availability of capital, climatic condition and use of modern technology also play important role in this regards.
6. It is clear that agriculture in eastern, south & western part cannot develop, unless irrigation is provided over much wider areas. For increasing cropping intensity, irrigation should develop in this region and for this purpose government should take leads because it requires too much capital investment.

SUGGESTIONS:

On the basis of above analysis, some measures can be apply to increase the cropping intensity through irrigation development in the study area.

1. The proper planning of watershed monument is very important. Since the last few years, there is always disrupt on distribution of available water for various purposes like drinking water, water for industries and also for Marathwada region, therefore water audit for each dam is important and there is need to mentioned the clearly use of water for various purpose during the year.
2. Rotation of water only for agriculture also decided and there is need to keep some extra reserve water emergence uses.
3. Applying the modern methods of irrigation like drip and sprinkler are very useful to use water effectively for agriculture. It saves the water from wastage. It is observed that such types of techniques are used mostly in Niphad, Nashik, Dindori, Satana , Deola and Chandwad tahsils of the study region in rest tahsils either it is very less or totally absent. Therefore to make awareness about these techniques in all area is useful. Israel is ideal example where such techniques are used very effectively.
4. In rainy season western part received good rainfall, but due to steep slope most of the water is drained into Arabian Sea, therefore this water can be arrest by constructing small dam and make some channels through water can be carried out towards eastern and south parts of the study region. For that purpose special survey can be carried out, which will be useful to locate the location of such dams and channel routes. It will provide water for agriculture during summer season. It also helps increase the cropping intensity of the study region.

REFERENCES:

1. Borse, Suryawanshi & Pagar (2011),"Irrigation development in the Nashik District Maharashtra: 1970 to 2005", Indian Streams Research Journal", Vol.1 Issue.4, May 2011 Pp.188-191.
2. Dr.H.R.Gautam (2015), "Innovations and new technologies needed to accelerate agriculture growth", Kurushetra: A journal on rural Development', Vol.63, No.11, September 2015, Pp.3-7.
3. Gazetteer of the Bombay presidency (1883) Nashik district volume No.19.Pp.5-9.
4. Kale & Patil (2012),"Impact of Ujjani Irrigation project on Agricultural Development of Solapur District", Maharashtra Bhugolshastra Sanshodhan Patrika', Vol.29, No.1 Jan-June 2012, Pp 111-116.
5. S. Kalaiselvi & I. Sundar (2011) "Interstate disparity in Cropping Intensity in India", 'International Journal of Business Management, Economic and Information Technology', Vol.3.No.2, July-Dec.2011, Pp.269-273.
