



punjab geographer

A JOURNAL OF THE ASSOCIATION OF
PUNJAB GEOGRAPHERS, INDIA

VOLUME 6

OCTOBER 2010



Short Communication

A SPATIO-TEMPORAL ANALYSIS OF CROP DIVERSIFICATION IN NASHIK DISTRICT- MAHARASHTRA**Suryawanshi D.S.
Pagar Sanjay Dagu****Abstract**

In this paper an attempt has been made to explain changes in crop diversification patterns in Nashik district from 1970-71 to 2004-05. In 1970-71, maximum crop diversification was found in Nashik, Dindori and Kalwan tahsils, whereas it was the minimum in Nandgaon tahsil. But in 2004-05 high crop diversifications was recorded in Nashik, Dindori, Kalwan and Trambak tahsils, whereas it was low in Sinner and Deola tahsils. During the study period the area under cereals (except baara) and pulses decreased, on the other hand the area under fodder, fruits and vegetables increased remarkably because, such crops yield regular, quick, and high returns to the farmers.

Introduction

Diversification of crops refers to raising a variety of crops on an arable land in one harvesting year. The study of crop diversification is not only useful in understanding the competition that goes on among different crops but also helpful for the identification of cropping pattern in a region. Such studies may help in planning and development of agriculture (Bhatewal, 2009). When physico- socio-economic conditions stimulate the growth of a variety of crops, farmers obviously tend to diversify the agricultural enterprises. Looking at the importance of crop diversification, many geographers have developed techniques for measuring the crop diversification. In India Bhatia (1965) introduced crop diversification techniques in order to understand crop competition in a region. The crop

diversification in India is slowly picking up momentum in favour of high value food commodities primarily to augment income. The nature of crop diversification differs across a region due to existence of a wide heterogeneity in agro-climatic conditions. The socio-economic and technological factors also play an important role in changing crop diversification (Suryawanshi, 2010). The farmers all over the world especially in the developing countries try to grow several crops in their holdings in an agricultural year (Majid Husain, 1996). In India, after Green Revolution, farmers adopted crop diversification for reducing financial risk and stabilizing farm income.

The agricultural experts are laying more emphasis on crop diversification for agricultural sustainability, maintaining soil health and gainful employment at the farm

throughout the year (Singh and Dhillon, 2006). Diversification of crops reduces the risk involved in farming hence usually farmers are inclined to grow more crops which lead to crop diversification in a region (Salunke, 2004). Due to crop diversification the cropping pattern also change at micro-level. As a result the crop diversification has brought various changes in cropping pattern of Nashik district. In this paper an attempt has been made to study the changes in the patterns of crop diversification in the study area from 1970-71 to 2004-05.

Study Area

Nashik district is situated partly in the Tapi basin and partly in upper Godavari basin. It lies between 19° 45' to 20° 45' north latitude and 73° 30' to 74° 45' east longitude (Fig. 1). It has an area of 15530 sq. km and population of 49,93,796 persons as per the 2001 census. There

are 15 tahsils in the Nashik district. The great trap region of the Deccan covers the whole district. It is entirely of volcanic formation. There are four types of soils in the Nashik district, black, red, red-black and light-brown. The soils in the Godavari and upper Girna valleys are quite deep and fertile. The climate of the district is generally dry except during the monsoon season. Temperature begins to increase rapidly from the later half of February. May is the hottest month with the mean daily maximum temperature of 40.6°C at Malegaon and 37.4°C at Nashik. December is the coldest month with mean daily minimum temperature of 11.3°C at Malegaon and 10.2°C at Nashik (Gazetteer of the Bombay Presidency, Nashik district, 1883). The average annual rainfall of the district as a whole is 1034.5mm. The rainfall in general decreases from west to east. The air is humid during the monsoon season and it is

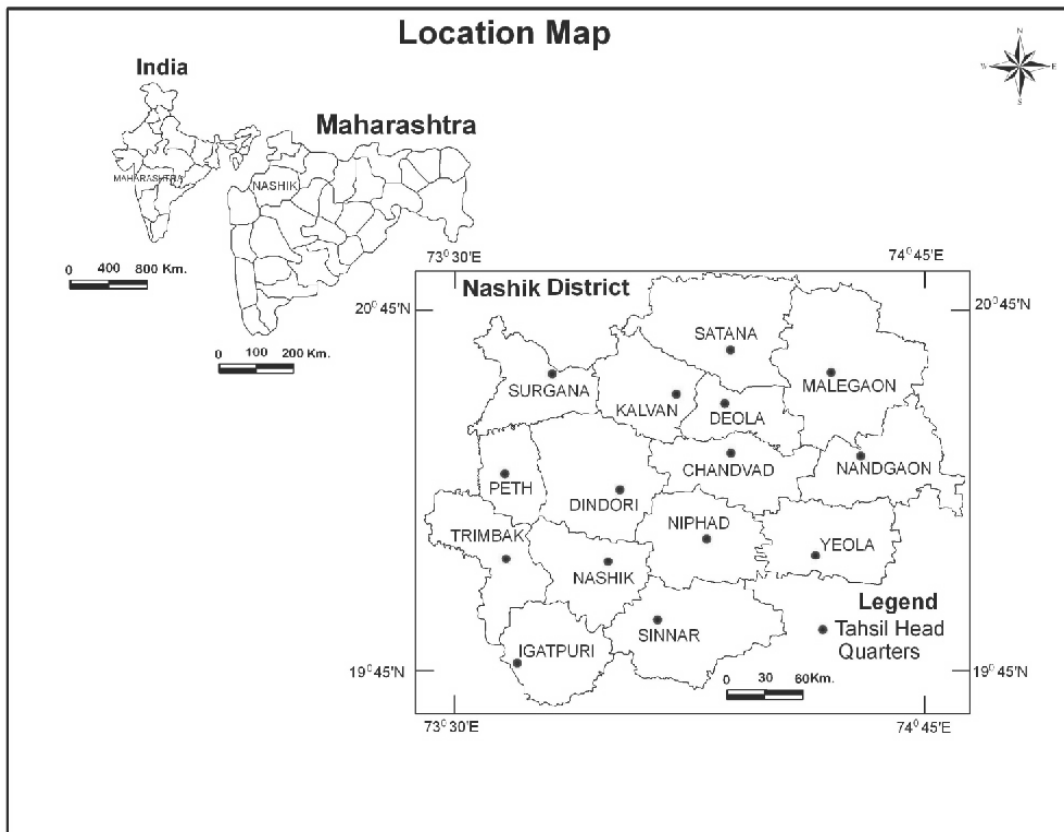


Fig. 1

generally dry during the rest of the year. Bajra, rice, sugarcane, onions, grapes, jawar, and vegetables are the dominant crops of the area under study.

Objectives

The major objectives of the present paper are (i) to investigate the degree of crop diversification and changes therein from 1970-71 to 2004-05; (ii) to understand the competition that goes on among different crops and; (iii) to highlight the factors responsible for crop diversification in the study area.

Data and Methodology

The present study is based on the secondary data obtained from Socio-economic Abstract of Nashik district (1971-72 and 2008-09), District Census Handbook and District Gazetteers. Crop diversification index method seeks to identify the behavior of crops over a period and space (Bhalsing, 2009). The tahsil has been taken as a unit for analysis of crop diversification in the study area. Data are processed and presented with the help of choropleth maps. In order to identify spatial pattern of crop diversification the method used by Singh and Dhillon (2006) has been adopted. They modified the method of Bhatia (1965) to calculate the index of crop diversification. Bhatia considered only those crops which occupied 10 per cent or more of the cultivated area in a regional unit, whereas Singh and Dhillon considered those crops which occupy 5 per cent or more of the total harvested area. Singh and Dhillon's formula for calculating index of crop diversification is given below:

Percentage of total harvested area under 'n' crops

$$\text{Index of crop diversification} = \frac{\text{Number of 'n' crops}}{\text{Total harvested area}} \times 100$$

Where n are those crops which individually occupy 5 per cent or more of the total harvested area. The Index of crop diversification for each tahsil is calculated by using the above formula for the year 1970-71 and 2004-05. The index of crop diversification is inversely related to the diversification i.e. lower the index more the diversification and higher the index more the specialization.

Crop Diversification Patterns

The tahsil -wise index of crop diversification for 1970-71 and 2004-05 is calculated and presented in the Table 1. On the basis of magnitude of crops diversification index, three crop diversification regions have been identified. The categories of crop diversifications, their magnitude and tahsils falling in these categories are presented in Table 2.

1) Areas of High Crop Diversification

The area recording index of crop diversification less than 15 are included in this category. In 1970-71 high crop diversification was found in Nashik, Dindori and Kalwan tahsils (Fig.2), but in 2004-05 one another tahsil that is Trambak was included in this category (Fig.3). In 1970-71, there was competition in cereals and pulses, but in 2004-05 such competition was found in bajra, rice, fruits, vegetables, and fodder crops. During this period, area under cereal crops decreased markedly, whereas area under fodder, fruits and vegetables increased significantly (Table 1).

2) Areas of Moderate Crop Diversification

The moderate level of crop diversification in 1970-71 was found in 9 tahsils, namely, Surgana, Baglan, Igatpuri, Yeola, Niphad, Chandwad, Peth, Malegaon and Nandgaon (Table 2) which have recorded index of crop diversification ranging between 15 to

Table 1
Nashik District: Index of Crop Diversification of 1970-71 and 2004-05

Sr. No.	Name of Tahsil	1970-71			2004-05		
		Index of crop Diversification	No. of Crops	Crops in order	Index of crop Diversification	No. of Crops	Crops in order
1	Surgana	19.42	4	OC,OS,OP,R	19.66	4	N,R,V,OC
2	Kalwan	14.26	6	B,OP,J,G,OC,W	9.88	5	F,B,R,FV,W
3	Deola	N.A	N.A	N.A	34.10	2	B,FV
4	Baglan	19.39	4	B,OP,G,W	22.61	3	B,FV,K
5	Malegaon	22.86	3	B,G,W	26.65	3	B,FV,G
6	Nandgaon	39.80	2	B,OP	27.11	3	B,G,CT
7	Chandwad	24.17	3	B,OP,FV	27.06	3	B,FV,F
8	Dindori	11.11	6	W,J,R,B,OP,OS	14.56	5	F,W,SC,V,G
9	Peth	23.78	4	OC,R,OP,OS	20.54	4	N,R,FV,U
10	Trambak	N.A	N.A	N.A	15.00	6	N,R,FV,V,U,G
11	Nashik	8.78	5	W,OP,OC,R,FV	12.83	5	FV,F,W,R,G
12	Igatpuri	16.03	3	R,OC,OP	20.63	4	R,F,N,G
13	Sinnar	24.76	3	B,OP,W	40.07	2	B,FV
14	Niphad	18.66	4	B,W,FV,G	22.28	3	FV,B,W
15	Yeola	20.54	4	B,J,OP,W	26.03	3	B,FV,J

Source: Compiled by Researchers

N.B: R=Rice, W=wheat, J=Jowar, B=Bajra, OC= other cereals, P=Pulses, S=Spices, FV=Fruits and Vegetables, OS=Oilseeds, OP=other-pulses, G=Groundnut, V=Vari, N=Nachani, CT=Cotton K=Kulid, C=Corn, GM=Gram, SC=Sugarcane and F=Fodder.

Table 2
Nashik District: Index of Crop Diversification of 1970-71 and 2004-05

Sr. No.	Categories of Crop Diversification	Magnitude of crop Diversification	Name of Tahsils 1970-71	Name of Tahsils 2004-05
1	High	Less than 15	Dindori, Nashik and Kalwan.	Dindori, Nashik, Kalwan and Trambak.
2	Moderate	15 to 30	Surgana, Baglan, Peth. Igatpuri, Yeola, Niphad. Chandwad, Malegaon, and Sinner.	Surgana, Baglan, Igatpuri, Yeola, Niphad. Chandwad, Peth, Malegaon and Nandgaon.
3	Low	More than 30	Nandgaon.	Sinner and Deola.

Source: Compiled by Researchers

30. These tahsils are located in the northern, southern and central parts of the study area (fig.2). In 2004-05 except Sinner tahsil, all other tahsils remained in this category while, Nandgaon tahsil was included in this category. Due to improvements in irrigation facilities the index of crop diversification has changed in this

tahsil from low in 1970-71 to moderate in 2004-05 (fig.3). The number of crops in Sinner tahsil decreased from three in 1970-71 to two in 2004-05. The area under other-pulses and wheat decreased, whereas area under fruits and vegetables increased. Improvements in irrigation facilities encouraged the cultivation

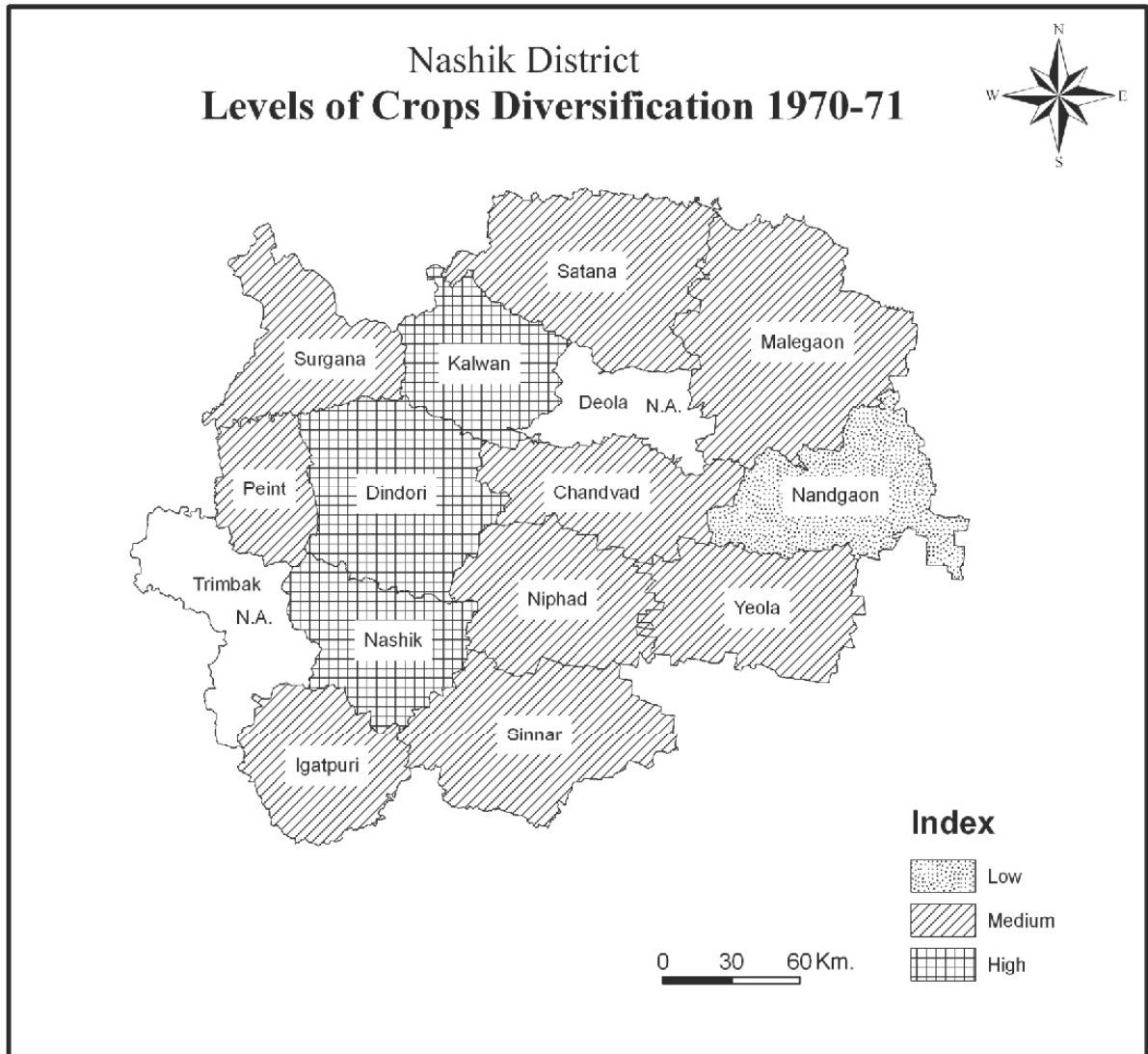


Fig.2

of vegetables and fruits in this tahsil. Apart from this a regular demand for vegetables and fruits from Nashik and Mumbai cities also attracted farmers towards high value crops instead of traditional ones. On the whole the main factors responsible for moderate level of crop diversification in these tahsils are inadequate rainfall (eastern part), development of irrigation facilities (central part) and increase in area under fruits and vegetables.

3) Areas of Low Crop Diversification

The low level of crop diversification is

found in areas having recorded index of crop diversification more than 30. In 1970-71 low level of crop diversification was found in Nandgaon tahsil, which is located in the rain shadow area of the Nashik district, but in 2004-05 low level of crop diversification, was found in Sinner and Deola tahsils (Table 2). In 1970-71 Sinner tahsil recorded moderate crop diversification. At that time three crops (bajra, other-pulses and wheat) dominated. But in 2004-05 area under traditional crops was shifted to fruits and vegetables. Like Sinner, Deola tahsil also recorded low level of crop

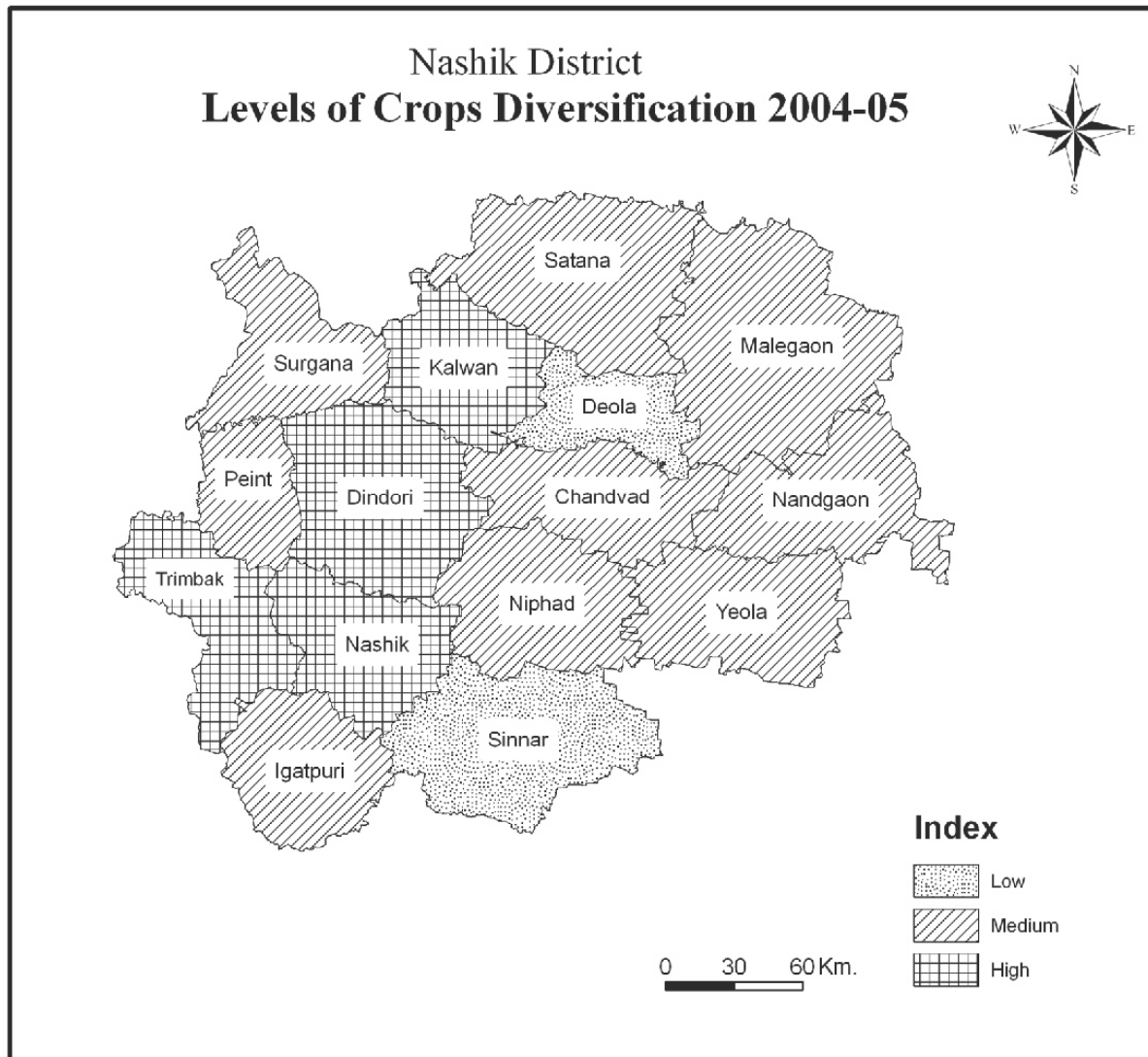


Fig.3

diversification in 2004-05 (Fig.3). In this tahsil the crops like bajra, fruits and vegetables dominated. The major factors responsible for low crop diversification in these tahsils are lack of irrigation facilities and the poor agricultural infrastructure.

On the whole it has been found that in 1970-71 cereal and pulses were dominating, but in 2004-05 area under horticultural crops increased in many tahsils of Nashik district. The degree of crop diversification in the district is closely influenced by the type of soil, uncertain weather, availability of irrigation and

market facilities and addition of sugar factories (Kapadnis, 1999).

Conclusion

In sum the level of crop diversification in the study area is not uniform.

High level of crop diversification is found mainly in Nashik, Dindori and Kalwan tahsils mostly due to favourable physical environment and well developed agricultural infrastructure. Area under high value crops like fodder, fruits (grapes and pomegranate) and vegetables (onion) providing quick and high returns to the small farmers increased

remarkably during these 35 years span of the study. Area under cereals except bajra and pulses decreased. Bajra however, remained first ranking crop in 1970-71 and in 2004-05 as well. Area under horticultural crops increased due to increasing demand from cities like Nashik and Mumbai.

References

- Bhatia S.S. (1965): "Pattern of Crop Concentration and Diversification in India", *Economic Geography*, Vol.41 No.1, Jan., 1965, pp 39-65.
- Bhatiwal B.P. and Jangle Pradnya (2009): "Changes in Diversification of Crops in Jalgaon District", *Shod, Samiksha aur Mulyankan* (International journal), Vol. No.2, Issue-5, Nov-08- Jan.2009, pp 469-470.
- Bhalsing R.R (2009): "Impact of Irrigation on Crop Diversification in Ahmednagar District, Maharashtra" *Shod, Samiksha aur Mulyankan* (International journal), Vol. No.2 Issue No.7, August 2009, pp 199-200.
- Gazetteer of the Bombay Presidency (1883) Nashik district volume No.19, pp 1-7.
- Kapadnis N.R. (1999): "A Geographical Study of Crop Diversification in Nashik District, Maharashtra" *The Deccan Geographer* Vol. 40(1), Jan-June 2002, pp 53-63.
- Majid Husain (1996): *Systematic Agricultural Geography*, Rawat Publication, Jaipur New Delhi, pp 241-245.
- Singh Jasbir and Dhillon S.S. (2006): *Agricultural Geography*, Tata McGraw-Hill Publication New Delhi, pp 256-264
- Salunke Vijaya (2004): *Fundamentals of Agricultural Geography*, AV Publication, Nashik, pp 3-5.
- Suryawanshi D.S. (2010): *Geography of Tribal Agriculture*, Oxford publishing Jaipur, pp 35.

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