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Editor : Dr. R. V. Bhole

'Ravichandram' Survey No-101/1, Plot No- 23, Mundada Nagar,
Jalgaon(M.S.) 425102
Email – info@jrdrb.com Visit – www.jrdrvb.com

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Impact of soil types on fruit farming in Nashik District

N. B. Bachhav, Associate Prof. Dept. of Geography, M. S. G. College, Malegaon Camp, Dist. Nashik. **nbbachhav1971@gmail.com**

Abstract: "Although, total fruit crops constitute a smaller proportion only 7.33 % (2015) in the gross cropped area of Nashik district but it is superior type of cropping pattern, which is aimed towards higher returns. However, the production of a particular fruit is restricted to specific locations as region's specialty. The differences in the micro-climatic conditions along with the topography at different locations mainly altered the physical characteristics of the basic soil type. So soils of study region indicate impact on cultivation of fruit crops. The distinctive type of specialized fruit farming had come into existence in the recent past. The grape farming from the year 1960 while the pomegranate farming around 1985 and strawberry after 2005. The farmers at particular locations specialize in the three major fruit crops subsequently regional distribution of fruit crops leads to identify three fruit farming zones in the study area viz. pomegranate in East, grape in South west, mango & strawberry in the west."

Key words: edapho-climatic conditions, fruits zones, soil types and physical characteristics

Introduction : The district under study is located in peninsular India, which is covered with 'Great Deccan Trap' of volcanic formation. These volcanic portions consist of compact stratified basalt rock. Hence the region is dominated by black cotton soil type (Dixit, 1986). But differences in the micro-climatic conditions along with the topography at different locations mainly altered the physical characteristics of the basic soil type. So soils of study region can be broadly grouped into four subtypes a) Soils of Sahyandri, b) Soils of Foothill Zone c) Deep Alluvial Soil and d) Soils of Scarcity Zone (Fig. 1)

The lateritic soils of high rainfall tract of sahyandri region are suitable for mango & strawberry in the west portion of study area. And deep black cotton and alluvial soils were favors the World famous Grape production from Nashik. The heartland of grapes is located in south west part of study area. As well as pomegranate orchards favor the light and coarser soils especially sandy loamy soils, those are dominated especially in east scarcity tract. These soils are free water draining in characteristic possessed good potential for pomegranate production. Against this background, present study was undertaken to find out impact of soil type on fruit cultivation in study region.

Aim and Objectives : Primarily the research work aims to study the impact of soil types on fruit cultivation in study area. In order to satisfy this aim of study, the following objectives were undertaken.

i) To understand different soil types in study region.
ii) To find out the area under fruit crops at specific locations

1.9 DATA BASE:

To begin with the present study, the secondary data were procured from various sources as mentioned below.

i) Office of Superintendent of Agriculture, Nashik District.

ii) District Agriculture Sub-divisional Offices

iii) Annual socio-economic reviews of Nashik district

iv) Government Soil Conservation Department, Nashik

v) Government Water resource and Irrigation department, Nashik

vii) The Directorate of Horticulture, Pune

viii) Maharashtra State Agricultural Marketing Board (MSAMB), Pune.

ix) Maharashtra Pomegranate Growers and Research Association, Pune.

Besides, the data were also obtained from reviewing books, research journals and reports, published magazines, newspapers.

Methodology:

The obtained secondary data was analysed by using following methods.

a) Statistical techniques: Arithmetic average, percentage, volume of change helped to identify certain relationship between soil and fruit crops.

b) Cartographic techniques: In order to have an overview of study region distribution maps were prepared by the Geographical Information System (GIS) i. e. Autodesk Map 2004, Illwis 3.7 and Arc View 3.2 computer software were used for preparing maps of the study region.

c) Interpretation of analysis: The results of secondary data analysis are summarized in the form of findings, and conclusions.

Discussion:

Nashik District has major four soil types and their physical characteristics are discussed in detail as below.

a) Laterites or Soils of Sahyandri:

This zone is characterized by high rainfall with warm humid climate; rich in natural vegetation gave rise to laterite soil type. Obviously, it contains high amounts of organic matter. They are light in texture with open or free draining structure but poor in all other fertility constituents. Depending on altitude, these soils vary in colour from yellowish, brown, grayish brown to reddish brown. This soil type covers the western part including Surgana, Peth, Trambak, Igatpuri tehsil. In this western portion mango and strawberry crops are dominant (Table 1)

b) Loamy or Soils of Foothill Zone:

It lies to east of Sahyandri covers the central portion covers Dindori, Niphad, Kalwan, parts of Satana tehsil. Due to sloping lands accompanied with moderate rainfall, it gets eroded easily. These soils derived from basaltic rocks contain ferrous or iron hence dark brown to grayish blank in color. They are sandy to loamy in texture. Secondary data reveals in table 1 reveals dominance of grape farming in this south west portion of study area.

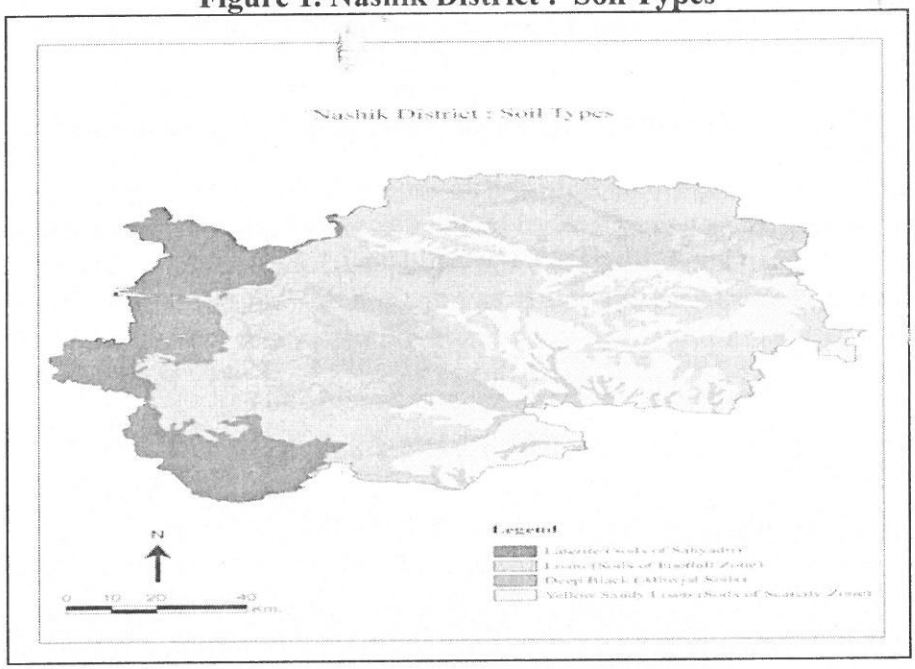
c) Deep Alluvial Soil of river plains:

The soils in the valleys of the Godavari, the Kadwa and Girna and Mosam rivers are quite deep and fertile. Due to a sudden decrease in slope, these rivers deposited certain amount of alluvium in their valleys. Their color is much darker and profile thickness is much deeper and uniform in depth. These soils have a larger proportion of clay.Soil characteristic like the high water retention capacity makes it potentially productive for agriculture especially for grape, guava and apple ber fruit crops.

d) Sandy loam Soils of Scarcity Zone:

These are light black color soils found in low rainfall region covers Chandwad, Sinnar, Nandgaon, Yeola, Deola, and Malegaon tehsils of district. Their texture ranges from sandy to sandy loam as well as structure is also highly variable being porous and free draining in characteristic. The moisture retentive capacity is low because of their shallow profile and a coarse texture. The free water drains easily. This characteristic of scarcity tract soil favour growth of pomegranate tree (Roy 1999). As well as recently apple ber and guava fruits are cultivated.

Figure 1. Nashik District : Soil Types



II) Fruit Farming:

The preceding discussion reveals that various soil types of the study area are properly explored for commercial fruit growing. As well, the natural resources in terms of relief, climate, soil and water resources are also quite favourable for its production. Nevertheless, a combination of technological, infrastructural, social and government policies together helped to promote a dynamic and progressive environment for modern farming. Table 1 shows this regional distribution of different fruit production in study area.

Even if, fruit crops were grown on smaller proportion of agricultural land but matter of satisfaction is that the district farmers had shifted towards the superior crops i.e. aimed towards higher returns (Singh and Dhillon 1998). Total fruit area grown rapidly from only 1.53% in 1991 to 6.53% in 2005. But the production of a particular

fruit is restricted to specific locations (Tawade 1981) in the study area also consequently four fruit farming zones were identified viz.

i) Pomegranate zone: Satana, Malegaon, Deola and Kalwan tehsils in northeast

ii) Grape zone: Niphad, Nashik and Dindori tehsils in the southwest

iii) Mango and strawberry zone: Igatpuri, Peth and Trambak tehsils in the western downghat

iv) Mix fruit zone: Chandwad, Yeola and Sinnar tehsil in the Southeast and central.

Table 1 Spatial Pattern of Fruit Cropping (%) in Nashik District

Sr. No.	Tehsil	Pomegranate	Grape	Mango	Guava	Other	Total %
1	Malegaon	98.02	0.76	0.62	0.16	0.44	100
2	Deola	97.70	0.22	0.00	0.22	1.86	100
3	Satana	95.82	0.10	3.33	0.00	0.75	100
4	Nandgaon	93.70	1.26	2.10	1.68	1.26	100
5	Kalwan	89.82	4.57	4.71	0.07	0.83	100
6	Yeola	66.22	7.33	1.11	11.67	13.67	100
7	Chandwad	43.36	53.14	0.34	2.02	1.15	100
8	Sinnar	20.31	12.48	23.54	0.98	42.69	100
9	Niphad	5.60	92.29	0.11	1.30	0.70	100
10	Dindori	5.08	92.86	0.71	1.28	0.09	100
11	Nashik	0.53	87.94	2.80	7.97	0.75	100

12	Igatpuri	0.00	14.07	84.43	0.00	1.50	100
13	Surgana	0.00	5.85	93.57	0.00	0.58	100
14	Peth	0.00	0.77	96.92	0.00	2.31	100
15	Trambak	0.00	0.00	77.78	0.00	22.22	100
District Average		53.35	37.29	4.35	1.65	3.36	100

(Source: Compiled from Socio-economic Abstract of Nashik District 2015 -16)

Findings:

In brief, it is concluded that owing to suitability of edapho-climatic conditions the production of a particular fruit is restricted to specific locations in the study area consequently four fruit farming zones were identified. Those are Pomegranate zone in northeast Grape zone in the southwest, Mango zone western downghat and mix fruit zone Southeast and central portion of study area.

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