

## CHAPTER-II PROFILE OF STUDY REGION



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### **PROFILE OF STUDY REGION**

#### **2.1 General Introduction**

Population of any region play vital role in the development of region. The study of population regarding age and sex composition, composition of religions, economic status, marital status, education status reveal real picture of the society. In order to deal with problems and ensure development of the region requires to consider the planning policies in term of quality and quantity of population resource. The growth of population includes the study of birth rate, death rate and migration. The socio-economic development of any region reflects in these elements. The distribution of population is largely controlled by geographical and cultural factors. It is, therefore, necessary to evaluate the geographical background of study region. The objective of this chapter is to examine physical and socio-cultural aspects, regarding physiography, drainage pattern, climate, soil, forest, population, transport, irrigation, occupational structure and landuse pattern in Nashik district.

#### **2.2 Physiography Divisions**

The study region has physiographical variations partly because of its location in Sahyadri and vast size. It appears like plateau dissected by hill ranges and rivers valleys slopping towards east. Geographically, study region is made up of volcanic formation of basalt rock. The study region is broadly divided into three major physiography divisions, namely, western region, central hilly region and east plateau region (Fig.-2.1). The western region lies to west of Sahyadri edge of Deccan plateau covering major part of Surgana, Peint, and Trimbakeshwar tahsils in study region. The height of this region ranges from 200 to 600 meters towards west upto boundary in study region and found dissected valleys by various streams flowing towards west. In central region has hills and ranges running from north to east and from west to east direction. This area includes in west part of Baglan, Kalwan, Devala, north Chandvad, Dindori, Trimbakeshwar, west part of Nashik, south part of Igatpuri and south Sinnar tahsils in study region. The hills and ranges mainly towards north formed boundary between Gujarat state in northwest and Dhule district (Fig.-2.1). The height of this range is 1300 meters in west and it decreases to 710 meters towards east near Galan fort.

Fig.-2.1 : Physiography Division

Mangi–Tungi is highest peak appears in this range (1331 meters altitude). Selbari pass lies towards east of this peak. Another parallel range is Salher-Mulher range. Satmala-Chandvad range runs across study region from west to southeast direction having highest peak Dhodap (1451 meters). Saptashring peak (1420 meters), Indrai (1410 meters) and Chandvad (1217 meters) appears in this range. Towards southwest, twin forts, namely, Anki and Tanki are located at the height of 960 meters in study region. This range is highly dissected by streams. Satmala-Chandvad range forms water divide between Girna and Godavari river basins. This range passes through Kalwan, Dindori, Devala, Niphad, Chandvad and Nandgaon tahsils. In south part, Trimbak-Anjaneri range stretches towards east from Bhaskargad. These ranges run through Nashik and Igatpuri tahsils. Harishgad (1113 meters) and Brahmagiri (1210 meters) are in south part in study region. The slope of this region is steep and forms cliffs in this range. This range is the source of river Godavari river at altitudes of 1274 meters. Anjaneri range runs east to west at the altitude of 1100 meters consisting irregular group of hills forming water divide between Godavari, Darna and Vaitarna river. On southern boundary, Kalasubai range stretches eastward. The highest peak of Maharashtra state, namely, Kalasubai (1646 meters) lies in this range.

The third physiographic division appears in east part in study region and it is characterized by occurrence of several off-shoots in eastward and southeastward. The height of this plateau varies from 400 to 600 meters and slope is towards east. This area covers 59 percent geographical area and is widely spreads over Malegaon, Nandgaon, Niphad, Yevla, Sinnar, east Nashik and Devala tahsils. In north, lands are deeply dissected and have found gullies on rough terrain of very poor soils. Godavari and its tributaries are flowing toward south part in study region. It forms broad valley of alluvial deposit in south, central and east parts in Nashik and Niphad tahsils and has high soil fertility. This area is moderately productive. Sinnar plateau is located in southeast having rough slopping ground.

### **2.3 Drainage Pattern**

The study region is drained by two major rivers, namely, Godavari and Girna river (Fig.-2.2). Satmala-Chandvad range acts as water divide between Godavari and Girna rivers while Sahyadri hills in west has water divide between west and east flowing rivers. The Godavari and its tributaries drain in southeast direction (Fig.-2.2). The tributaries of Godavari originate from Satmala-Chandvad ranges in north. Darna is major tributary of Godavari flows from south.

The average altitude decreases from 1000 meters in west upto 300 meters in east part in study region. Nashik, Dindori, Niphad, Sinnar and Yeola tahsils drain by Godavari and its tributaries. Godavari is most important river in study region. Out of total length of river is 111 kilometers distance in study region. Godavari river originates near Trimbakeshwar and flows towards southeast direction in study region (Fig.-2.2). This river has deep channel and narrow alluvial flood plain. Darna river rises in Kalasubai range towards southern part in study region. The total length of river is 80 kilometers draining in Igatpuri, Nashik and Niphad tahsils. Kadwa is another tributary of Godavari river rising in Satmala range and flows toward east in Dindori tahsil for 74 kilometers distance, out of larger part lying hilly in Dindori and Chandvad tahsils. In Niphad tahsil, this river is a major source of irrigation. Kadwa river joins Godavari river near Niphad and flow from fertile soil. The Kashyapi river originates in Sahyadri hills. Banganga river is north bank tributary rises northwest in Ramshej hill and flows towards east and finally joins Godavari river.

The north part of study region is drained by river Girna and its tributaries. Aram, Maosam, and Panjhara are major tributaries of Girana river. Girna river rises in northwest in study region in Sahyadri hills and flows towards east having wide bed and high bank. The length of this river is 144 kilometers. This river flows through Kalwan, Devala and Malegaon tahsils. Aram river originates near Salher fort in Dholbari range and flows towards south then turns towards east and further joins to Girna river. Mosam is a tributary of Girna river originates in Sahyadri hills and joins Girna river near Malegaon. Panjhara river is tributary of Girna river. The west part in study region is drained by small rivers and streams and are flowing towards west. These rivers are meandering through deep valleys, gorges and waterfalls. Damanganga and Vaitarna rivers are flowing towards west in study region. Damanganga river rises in hilly area of Sahyadri and flows through Peint tahsil in study region whereas Vaitarna river rises in southwest part near Trimbak and drains in west in study region.

#### **2.4 Soil Types**

Soil is basic factor for agriculture. Soil texture and thickness constituent of soil determining crops growth. The soils are the function of topography, climate and vegetation. Nashik district is located on 'Deccan Trap'. Hence, parent material of soil is more or less uniform (Ray Chaudhari, 1964).

Fig.-2.2 : Drainage Pattern

It is mainly derived from igneous rocks especially of extrusive origin. Considering topographical and climate conditions, soils in study region can be classified into four types, namely, red brown soil, loam soil, black soil and yellow soil (Fig.-2.3). Red brown soil appears in west part in heavy rainfall zone in study region. Surgana, Peint, Trimbakeshwar Igatpuri and parts of Nashik tahsils have found this soil. Climate experiences slightly warm-humid and topography is hilly and rugged. This soil is red and brownish in color and has shallow. The PH of this soil ranges from 7.4 to 8.2 containing less clay and silt but is rich in organic matter. The soil thickness varies from 30 to 120 cm depending upon slope of region. Loam soil appears in east part in hilly portion. Dindori, east part of Trimbakeshwar, central and eastern Nashik, Niphad, Kalwan and Baglan tahsils appear this soil. This soil has PH value of more than 8. The rainfall is moderate in this zone. This soil is rich in organic matter consisting clay 4 percent and 20 percent silt (Ray Chaudhari, 1964). Clay loams soils are found in low lying areas and banks of river. Loam soils appear at higher level and are found in narrow strip. Black soil is mainly found near the bank of Godavari and Girna rivers. These soils contain nitrogen, phosphate and calcium carbonate and are found favorable for cultivation. Yellow soil is found in southeast part in study region and it exists in the form of disconnected strip in Chandvad, Sinnar, Nandgaon, Yeola and Malegaon tahsils. This soil is shallow, coarse and light in color. The PH ranges from 8.3 to 8.5. This soil is also termed as yellow sandy loams due to less organic matter and nitrogen.

## **2.5 Climate**

The climate in study region experience monsoon type and it is divided into four seasons, namely, winter, summer, monsoon and post-monsoon. The average maximum temperature during the year is 35° centigrades and minimum is about 18° centigrades. The maximum temperature is found in May and lowest in August. The minimum lowest temperature is observed in January (10.6 centigrades) and highest in May (38.3 centigrades) (Fig-2.4A). From June temperature begins to decrease remarkably as the beginning of southwest monsoon season. Day temperature in October increases by two to three degrees centigrades. However, night temperature decreases after September. November onwards temperatures is found decreasing rapidly. January is the coldest month (11.8° centigrades).

Fig.-2.3 : Soil Types

Fig.-2.4 A : Average Temperature at Nashik

B : Monthly Average Rainfall at Nashik

May shows maximum temperature (38.3° centigrades). The climate during southwest monsoon season is humid, dry in post monsoon experience cold in winter and dry in summer season.

Table-2.1 : Temperature at Nashik

Months	Maximum	Minimum	Months	Maximum	Minimum
January	29.4	10.6	July	28.2	21.6
February	34.8	11.2	August	27.9	20.9
March	34.8	15.9	September	30.8	20.3
April	38.1	19.9	October	31.1	17.3
May	38.3	23.3	November	30.8	13
June	31.8	22.2	December	30.8	11.8

Source: Indian Metrological Department, Pune.

Note: Temperature is given in degree centigrades.

Table-2.2 : Average Rainfall at Nashik

Months	Rainfall	Months	Rainfall
January	3.5	July	418.1
February	1.4	August	276.7
March	1.8	September	182
April	5.5	October	64.7
May	19.7	November	27
June	169.7	December	4.5

Source: Indian Metrological Department, Pune.

Note : Rainfall is given in Millimeters.

The average annual rainfall in study region is 1174.6 millimeters. There are considerable variations in receiving rainfall and it decreases from west to east (Fig.-2.5). Igatpuri receives 3341.6 millimeters and Peint (2351.6 millimeters) of average annual rainfall. Igatpuri, Peint, Trimbakeshwar and Surgana tahsils have found averages rainfall of more than 2000 millimeters. Baglan and Malegaon tahsils receive less than 500 millimeters rainfall. Devala, Chandvad, Niphad tahsils receive moderate rainfall between 500 to 1000 millimeters (Fig.-2.5). The rainy season starts from middle of June and lasts till end of September. Amount of rainfall is greater in July and August (Fig.-2.4B). 88 percent rainfall receives during southwest monsoon season in study region. During pre and post monsoon months rainfall occurs in form of thunder showers. Skies are heavily clouded to overcast during the southwest monsoon season. The rest of year sky is clear. Winds are generally moderate strengthening wind force during summer season and southwest monsoon season in study region.

Fig.-2.5 : Rainfall Distribution

## 2.6 Forest

Forest covers 3343.5 square kilometers area accounting 21.53 percent in study region. This forest consists of reserved forest (2,920.7 square kilometers), protected forest (245.45 square kilometers) and unclosed forest (173.32 square kilometer). Among this, 928.88 square kilometers area in west part have dominance of timber and fuel wood. The remaining forest appears on three ranges of hills running east to west direction in study region. The distribution of forest is not uniform due to variations in rainfall, soil, climate and topography (Fig.-2.6). The west part lying tahsils Peint and Surgana occupies more than 40 percent forest. Kalwan and Trimbakeshwar tahsils have 30 to 40 percent forest on hilly area where rainfall receives 2000 millimeters. “Tropical moist deciduous forest” is found in Baglan and Nandgaon tahsils on 30 percent area. Dindori, Nashik, Igatpuri, Sinner, Devala, Malegaon tahsil has 20 percent deciduous forest. In central part, Chandvad and Niphad tahsils have less than 10 percent forest due to more cultivated irrigation and hence has thick population. Anjan trees are common in this area. In Nandgaon range has found in patches of Babul and Khair trees.

## 2.7 Population

Population influences the economic development and level of consumption and workforce in study region. The study region spreads over 15530 square kilometers and has population of 49,93,796 (Census, 2001) accounting 5.15 percent to total population in Maharashtra state and is unevenly distributed. The provisional population of study region is 6107187 in 2011 (Appendix-A).

Table- 2.3 : Density of Population in Nashik District

Name of Tahsils	1981	2001	Name of Tahsils	1981	2001
Nashik	495	1625	Nandgaon	146	217
Peint	106	173	Yevala	130	221
Dindori	124	197	Niphad	277	417
Surgana	99	172	Sinnar	144	216
Kalwan	117	193	Igatpuri	164	270
Baglan	150	211	Trimbakeshwar	N.A.	154
Malegaon	268	432	Devala	N.A.	225
Chandvad	139	214	District Total	191	322

Source : District Census Handbook, Nashik District for 1981 and 2001.

Note : N.A. = Data is not available.

Fig.-2.6 : Distribution of Forest

According to Census 2001, density of population was 322 persons per square kilometer and it varies within study region. Nashik tahsil has found highest density (1625 persons per square kilometer) while Trimbakeshwar shows lowest density (154 persons per square kilometer). Nashik, Malegaon and Niphad tahsils have found population density of more than 400 persons. The remaining tahsils have moderate population density between 200 to 300. Trimbakeshwar, Peint, Dindori and Surgana tahsils have recorded 100 to 200 persons density. Fig.-2.7 exhibits that population density increases from 1981 to 2001. West part is study region showing low density due to dense forest and hilly area. The central and northeast parts in study region have high density of population because of fertile soil, sufficient irrigation facilities, high urbanization and industrialization too. The study region has rapid population growth (Fig.-2.8). Nashik tahsil has found highest growth of population followed by Malegaon from 1961 to 2001 (Fig.-2.9). The remaining tahsils have indicated average growth of population. Nashik is head quarter of district, urban center, educational and industrial centre, hence in-migration is fast as compared to other tahsils in study region.

Table-2.4 : Sex-ratio in Nashik District and Maharashtra State

Years	Nashik District			Maharashtra State		
	Rural	Urban	Total	Rural	Urban	Total
1961	971	874	946	995	801	936
1971	954	905	940	985	820	930
1981	959	889	937	987	850	937
1991	955	915	940	972	875	934
2001	945	900	927	960	873	922

Source : District Census Handbook, Nashik District, 2001.

Table-2.4 exhibits population sex ratio in Nashik district and Maharashtra state from 1961 to 2001. The sex ratio in study region is higher (927) than Maharashtra state (922). The urban sex ratio in study region was 900 in 2001. The rural sex ratio in study region was 945 in 2001 which is less than Maharashtra state. The rural sex ratio in study region was greater than urban sex ratio. Nashik district has 61.2 percent rural and 38.8 percent urban population. The study region has recorded 74.15 percent literacy in 2001. Literacy is high in urban area (83.98 per cent) and less in rural area (67.79 percent). Female literacy is found less in rural area than male (64.16 percent) accounting 56.35 percent in study region.

Fig.-2.7 : Population Density

Fig.-2.8 : Population Growth

Fig.-2.9 : Tahsilwise Population Growth in Nashik District

The scheduled caste accounts 8.54 percent and scheduled tribes 23.92 percent together contributing 32.46 percent. The distribution of scheduled tribe population is uneven in study region. It is mainly concentrated in west and northwest parts in five tahsils in Peint, Surgana, Trimbakeshwar, Dindori and Kalwan having dominance of more than 50 percent tribes population, hence, these tahsils are known as tribal tahsils. Fig.-2.10 exhibits the tribal density for 1981 and 2001 in study region. In 1981, tribal density in Peint and Surgana tahsils have found more than 80 persons per square kilometer whereas in 2001, tribal density in Igatpuri, Nashik, Trimbakeshwar, Dindori and Kalwan tahsils have increased more than 80 (Fig.-2.10). It reveals that the tribal density has decreased from west to east in study region. Surgana has highest tribal population density 163 in northwest part in study region whereas Yeola tahsil has lowest tribal density (20) in 2001. It is noted that tribal population is mainly concentrated in isolated hilly and forest area in west part tahsils of study region.

## **2.8 Transport**

Means of transport acts as nerve system in study region as it supports for development. The study region has national highways, state highways and district roads. Nashik city is well connected with other district headquarters in Maharashtra state and major cities of neighboring states (Fig.-2.11). Total length of railways is 358 kilometers in study region. Three rail routes, namely, Bombay-Bhusaval, Manmad-Daund and Manmad-Secunderabad transverse within study region. Bombay-Bhusaval route passes from Igatpuri and goes upto Manmad covering 287 kilometers distance. Nashik road railway station is situated 10 kilometer distance from Nashik city. Manmad is a junction linking south part in study region. Manmad-Daund rail route is broad-gauge railway route (44 kilometers). Manmad-Kacheguda route connects Manmad and Hyderabad. The railway route supports for trade and commerce in study region.

The study region has 7105.0 kilometers roads. There are two national highways, namely, Mumbai-Agra and Pune-Nashik. Mumbai-Agra national highway (N.H. 3) enters Nashik district from Igatpuri and runs in northeast direction within study region. The road runs parallel to railway routes in study region (Fig.-2.11). It traverses through Igatpuri, Nashik, Chandvad and Malegaon tahsils for 185 kilometers. Pune-Nashik national highway (N. H. 50) has 54 kilometers length connecting Sinnar, Sangamner and Pune.

Fig.-2.10 : Tribal Population Density

Fig.-2.11 : Transportation

There are 14 other state highways, out of these three state highways connecting Bombay-Agra national highway and remaining connects are interior part of study region having total distance of 1655 kilometers. Other district roads connect rural areas and remote settlements. The density of roads is found more in central, northeast parts and west part in study region.

## 2.9 Landuse Pattern

Land is used for different purposes. The use of land shows relationship between people and surrounding condition of study region. In study region, more than 60 percent population is engaged in agriculture (Fig.-2.12A). Area under forest is 21.53 percent, area not available for cultivation is 9.28 percent, fallow land is 7.91 percent and net sown land 61.26 percent. This land use pattern shows that more number of peoples are engaged in primary activates (Appendix-B).

Table-2.5 : Landuse Pattern in Nashik District

Sr. No.	Land Utilization	Area	Percent
1	Area under forest	3343.50	21.53
2	Area not available for cultivation	1441.96	9.28
3	Fallow land	1228.88	7.91
4	Net sown Area	9515.11	61.26

Source : District Statistical Abstract, Nashik District 2010. Note : Area in Square Kilometers

## 2.10 Occupational Structure

The occupational structure can be categorized into two types, namely, main workers and marginal workers. Both these types can be sub-categories as farmers, agricultural labors, household workers, and others workes. Main workers are those who work at least six months in one year preceding. Marginal workers are those who work some time but not for the period more than six months in one year preceding. The domestic workers are those who are engaged in house work. Other workers are those who are engaged in livestock, forest, fishing, hunting, plantation, mining quarrying, manufacturing, processing, servicing, construction, tread and commerce. Fig.-2.12 B exhibits the occupational structure in study region. It is observed that 87.45 percent main workers and 12.55 percent marginal workers in study region. This indicates the prosperity of study region. The farmers accounts 37.68, agriculture labor (24.71), other workers (35.41) and marginal it (2.18). Over all, more than 60 percent workers are engaged in agricultural activities in study region.

Fig.-2.12 A : General Landuse 2010

B : Occupational Structure 2001

## **2.11 Irrigation**

Rivers, canals, wells and tub wells are the means of irrigation in study region. Niphad tahsil has highest 32.8 percent irrigation (Fig.-2.13) due to water available of Godavari river and its tributaries. Baglan, Malegaon, Devala, Chandvad and Sinner tahsils have 5 to 10 percent irrigation. In west part tahsils, namely, Surgana, Peint, Trimbakeshwar, Igatpuri and in Dindori, Kalwan, Yevala and Nandgaon tahsils have found less than 5 percent land under irrigation due to hilly track in study region.

## **2.12 Resume**

This chapter has examined the physical and socio-economic conditions of Nashik district. Physiographically, region is divided into three divisions, namely, western region, central region and eastern region. Sahyadri ranges lies in west part. Sahyadri has three offshoots, namely, Galan- Selbari range in north, Satmala-Chandvad range in middle, Trimbak-Anjaneri range and Kalasubai range in south. The study region is drained by Godavari and Girana rivers. These rivers and their tributaries are the source of water for irrigation. Red brown soil, loam soil, black soil and yellow soil appear in study region. The study region experiences monsoon type climate consisting of four seasons, namely, winter, summer, monsoon and post-monsoon seasons. The average rainfall is 1174.6 millimeters. The average an maximum temperature is observed in summer season in May (38.3<sup>0</sup> centigrades) and minimum temperature in January (10.6<sup>0</sup> centigrades). Nashik district covers 21.53 percent forest area. The study region has 49, 93,796 population and 322 persons per square kilometer density in 2001. Nashik tahsils has highest density (1625) (Table-2.3). The percent of scheduled caste (8.54 percent) and scheduled tribes (23.92 percent) are found in study region. Tribal population is concentrated in hilly and forest area. The region enjoys 358 kilometers railway routes and 7105.0 kilometers road length helping for the distribution of agricultural produces and trade. The main workers and marginal workers are classified into farmers, agricultural labours, household workers and other workers. The highest irrigation is identified in Niphad tahsil accounting 32.8 percent in study region.

Fig.-2.13 : Irrigation in Nashik District