

CONCLUSION, PLANNING REGIONS AND SUGGESTION

In recent years, efforts have been made to analyze and find out the nature of soil and their characteristics for suitable and proper growth of crops and their productions. Such a study is heavily dependent on scientific and comprehensive study of landuse at macro and micro levels. The present study is therefore significant in this respect. This study concentrates at the tahsil level.

The present investigation has been carried out to assess, analyze, describe and interpret the pattern of agricultural land use of the Nashik district with a view to investigate the influence of certain physical and socio-economic variables on landuse pattern and to provide an indepth study for adjudging scientific, proper and efficient landuse to meet the demand of food from the increasing population in the district and to demarcate agricultural regions for planning.

The soil of the district is essentially derived from the Deccan Trap which is the predominant rock formation of the district. The soil formation is mainly affected by the climatic condition and topography of the district. The soil in the Godavari, Kadava, upper reaches of the Girna and the Mosam Valley is quite deep and fertile. The relief in the rest of the district is undulating and susceptible to erosion. Light shallow soil is found on hill slopes and very coarse soils at higher elevation.

The observations, analysis and findings discussed in the preceding chapters are presented below;

Nashik district is predominantly agricultural in its occupational structure with 59.00 percent working force to total workers engaged in agriculture. The types of soil play a vital role in agricultural landuse pattern in the district. Even variations in rainfall amount affect agricultural landuse in the area under study.

The socio-economic variables have influenced the spatial distribution of agricultural landuse patterns in Nashik district. The spatial distribution of population reveals the significant variations within the district. The major concentration of population is associated with deep black soil zones in Godavari and Girna basin of the district. The density variations in the district range from 159 persons per square Kms to 1631 persons per square kilometer. The lower reaches of river Godavari and river Girna in the district have dense population due to fertile soils. With growing population in the district, the pressure on land has been increasing and therefore per capita land has significantly decreased from 1951 to 2001. It had 1.086 hectare per capita land in 1951 and it decreased 0.311 hectare per capita land in 2001. The relative importance of agricultural activity has been pointed out by working force (59.00 percent to total workers) in the district, comprising 35.1 and 64.9 percent agricultural labours.

The size of land holding has been adversely affected by continuous disintegration of land holdings due to division and sub-division of family. The average size of land holding is 2.52 hectares.

The total irrigated area is 17.7 percent to net sown area in the district. Well and canal irrigation is the source of water supply to crops significantly in the ricer basins. The highest area under irrigation is recorded at Nashik (72.01 percent to net sown area)

followed by Niphad (47.59 percent) while lowest area under irrigation is recorded at Surgana (0.46 percent to net sown area) followed by Peth (1.47 percent to net sown area).

The accessibility by means of transport, within the district is easy, a dense road network, covering railway, National highway, State high way, major district road, other district road and kachcha roads occur in the area. The western part of the district comparatively sparse road network due to hilly area.

Thirteen regular markets, 24 sub-markets and 158 weekly market centers serve to agglomerates and distribute the agricultural products and people within and outside the district.

Land utilization study unfolds different uses in the district. The net sown area manifests spatial variations within the district, with concentration in the river basins in fertile tract having high yield per hectare. Western parts in areal extents on coarse shallow soils have low concentration of net sown area.

This decrease may be attributed to increasing population, development of transportation routes and residential purpose. The highest area under follow land has increased to 8.44 percent to total geographical are followed by cultivable waste 6.74 percent to total geographical area in the district.

The cultivation of crops in Nashik district is confined to kharif and rabi seasons. It is noticed that kharif season is important in raising varieties of crops, with larger in areal extent in the district. It is observed that more than 70 percent to net sown area is under kharif crops.

Tahsilwise variation of intensity of irrigation for the region as a whole comes to +6.34. All tahsils records positive variation in intensity of irrigation except Malegaon. Nashik tahsil of the

study region records highest (+61.56) positive variation in intensity of irrigation. However the highest positive variation is obvious in Chandwad (17.02) and (Dindori (11.48) tahsil. Malegaon tahsil records lowest negative variation (-0.65) during the study period (table 5.5).

The study of levels of agricultural development is based on the method of cluster analysis. For this study six parameters like percentage of net sown area to total geographical area, land under irrigation as percentage of net sown area, number of tractors per 100 hectare of net sown area, number of livestock per 100 hectare of net sown area, loan advanced in Rs. per 100 hectare of net sown area and over-dues in Rs. per 100 hectare of net sown area have been chosen.

Applying this parameters and find out five development regions in the district. In 1980-81 there was no any tahsils under the most developed and more developed category of the district, while Nashik and Niphad observed as a developing tahsils and Dindori, Satana, Malegaon, Chandwad, Yeola, Sinner and Igatpuri found in backward class, while Peth, Surgana, Kalwan and Nandgaon observed as a most backward tahsils. In 2000-01, Nashik, Niphad and Malegaon ranks as most developed tahsils, Chandwad, Yeola and Igatpuri as a most developed tahsils, Dindori, Satana and Sinner as a Developing tahsils, Kalwan and Nandgaon records as a Backward tahsils, while Peth and Surgana records as a most backward tahsils.

The hierarchical cluster of the tahsils for the year 2000-01 further analyzed and grouped into the following broad categories;

i) Backward Tahsils: Peth and Surgana come under this category. Agriculture is not possible in these tahsils because of maximum area is covered by hills , mountain spurs, forest and heavy rainfall but these tahsils are important for water resources.

ii) Potential Tahsils: Dindori, Kalwan, Satana, Nandgaon and Sinner tahsils are the potential tahsils. Due to the spatial variation of location the potential tahsils and various socio-economic and physical factors, these tahsils having nearby 50 percent of net sown area and 10 to 20 percent of area under irrigation to net sown area. Hence the rabbi agriculture is very limited. Further the soil is thin and slopping and it is easy to erosion, as well as the transportation and market facilities also limited. However if there is careful planning and management of water resources these tahsils can be put to better use agriculturally and socio-economic development is possible in these tahsils.

iii) Developed Tahsils:

Nashik, Niphad, Malegaon, Chandwad, and Yeola tahsils are identified as developed tahsils. All these tahsils have a high percentage of net sown area under irrigation. They are located in river basins and flood plains and have better soil. There is an all-round development in agriculture in terms of poultry, dairy farming, truck-tractor farming, agro-based industries and mechanization with the advent of sugar factories, MIDC, agro-based industries. Leveled land, fertile soil, high percentage of irrigation, well developed transportation facilities, development of agricultural markets, awareness of modern agriculture, use of hybrid seeds, fertilizers, pesticides and insecticides in these tahsils

is maximum. All these factors make the developed tahsils agriculturally more developed part of the district.

The ranking of crops denotes the relative strength of individual crops. Bajra ranks as the first ranking crop in 9 tahsils (60 % to total tahsils) and consequently occupies an outstandingly predominant position in 345043 hectares. Vegetable stands second in rank in three tahsils (20 % to total tahsils) and pulses stand third in rank in four tahsils. Other crops namely nachani, rice, fodder, maize, oilseed, wheat, fruits, Jawar and sugarcane have low percentage than that of Bajra, vegetable and pulses.

Twelve crop combinations have been identified in 1960-61 while ten crop combinations have been identified in 2000-01 for Nashik district (map 6.9A/B). Among ten crop combinations eight crop combinations are relatively dominant in areal extent in six tahsils. Further it is noticed that four and nine crop combinations have wide distributed. Four crop combinations obtained at Peth, Surgana and Igatpuri with Nachani, pulses, fodder, rice and oilseeds in this combination, while nine crop combinations obtained at Satana, Sinner and Deola tahsil with Bajra, maize, pulses, fruits, sugarcane, wheat, vegetable, oilseeds, Jawar, fodder and rice are common constituent crops in these combinations. Three crop combinations obtained at Trimbak with Nachani, rice and fodder in this combination. Seven crop combinations obtained at Nashik with vegetable, Nachani, fodder, wheat, fruits, pulses and oilseeds in this combination. And ten crop combinations obtained at Malegaon with Bajra, oilseeds, vegetable, pulses, fruits, maize, Jawar, cotton, wheat and fodder are common constituent crops in these combinations.

The existing diversifications of crops serve to unfold the competition among them. The resultant crop diversifications registered moderate increase in magnitude, covering eight tahsils on 371934 hectares, followed by low crop diversification in six tahsils on 371934 hectares, while very low crop diversification in one tahsil on 27025 hectares. It has been noticed that all tahsils in the district where vegetable, fruits and fodder entering into the moderate, low and very low crop diversification during the study period. Bajra, vegetable, fodder, fruits, maize, pulses, wheat, rice, sugarcane, oilseeds and nachani in Nandgaon, Nashik, Kalwan, Niphad and Dindori and rice, fodder, pulses, nachani and oilseeds in Peth, Surgana, Igatpuri tahsils comprise in moderate crop diversification class. Low crop diversification is noticed at Sinner, Satana, Malegaon, Yeola, Deola, and Chandwad tahsils whereas very low crop diversification is noticed at Trimbak tahsil.

The correlation coefficient establishes relationship between chosen variables. The strong positive correlation was found between percentage of irrigation and fruits (0.88), rice and fodder (0.84), bajra and Nachani (0.82), Nachani and maize (0.78), irrigation and Sugarcane (0.74), population density and fruits (0.70), irrigation and vegetable (0.68), fruits and sugarcane (0.66), rice and oilseeds (0.65), nachani and pulses (0.64), population density and irrigation (0.59), population density and vegetable (0.59), population density and wheat (0.54) and vegetable and fruits (0.520). This fact explains that areal extents of above crops are increasing with increasing area under net sown area and therefore the variables show positive correlation.

Negative correlation established between bajra and fodder (0.89), nachani and wheat (0.88), bajra and wheat (0.83), net

sown area and agricultural density (0.75), population density and nachani (0.69), nachani and vegetable (0.68), maize and jawar (0.68), bajra and rice (0.62), rice and vegetable (0.57), agricultural density and bajra (0.56), population density and bajra (0.53), bajra and oilseeds (0.53) and irrigation and rice (0.52). These variables are not experiencing a proportional increase in area in the district and therefore show negative correlation.

The multiple regressions demonstrate the degree of correspondence between variables in correlation coefficient. The net sown area in multiple regression points for limitations imposed by population density and agricultural density variables indicating multiple value of 0.9122. Population density shows multiple correlation value of 0.9193 for limitations imposed by net sown area and irrigation. Irrigation shows high multiple correlation value of 0.9674.

Agricultural density and bajra in multiple regressions Points for limitations imposed by net sown area and population density variables indicating multiple values of 0.8931 and 0.9790. Vegetable reveals high degree of association with population density and irrigated area of value of 0.8734.

Planning Regions of Nashik District

On the basis of the preceding study, an attempt has been made to suggest planning regions of the areas under study as below;

Overall study of an agricultural landuse in Nashik district, the physical limitations, cultural characteristics of the people , appraisal of the natural resources, principle characteristics of the demographic patterns, transportation network and overall orientation of the region towards Mumbai and Thane industrial

areas have been considered in delimiting planning regions. Secondly as the researcher was born and brought up to Nashik and Malegaon, his experience over long period of time, the experience gained during the course of field trips in the study region have provided insight as regards the characteristics and the prime needs of the region. On the basis of these factors an attempt has been made to suggest the planning regions as below;

The planning regions

1. Relatively more developed regions:

Nashik

2. Moderately developed regions:

Niphad, Chandwad and Malegaon

3. Less developed regions:

Dindori, Kalwan, Satana and Deola

4. Backward regions:

Nandgaon, Yeola and Sinner

5. More backward region:

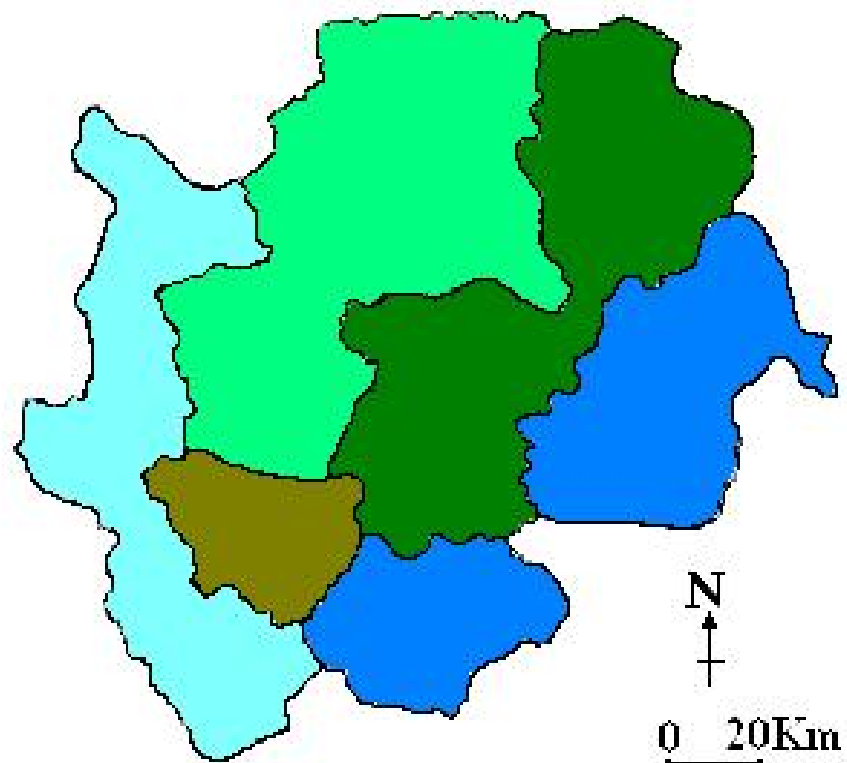
Peth, Surgana, Trimbak and Igatpuri

The peculiarities and possibilities of each of these regions have been summarized below;

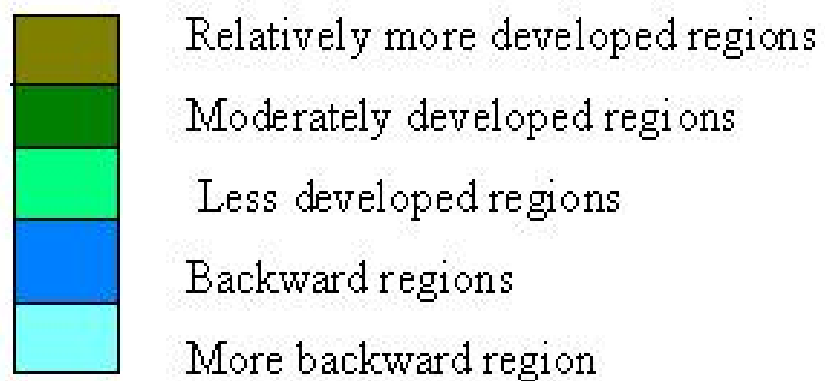
1. RELATIVE MORE DEVELOPED REGIONS:

Nashik tahsil is in this region is mostly oriented towards Nashik city with all sorts of facilities and services due to the progress of education, industries and commerce in the city. There is in-migration from the surrounding areas to the Nashik city. A sizable number of workers and students commute from surrounding villages to city. Growth of dairy industry around the city is yet another feature that indicates new trends in its

Nashik District: Planning Regions



Planning Regions of Nashik District



economy. The region has the facility of several goods, roads and the railway line that have been helpful in the development of agriculture, industries and transportation services. Though this model region is characterized by frequent famines the constructions of percolation tanks have been beneficial in the development of agriculture.

2. MODERATLY DEVELOPED REGIONS:

This region consists of mainly Niphad, Chandwad and Malegaon. The region has the facility of extensive canal and well irrigation as it occurs in the Godavari and Girna river valleys. As well as national Highway pass goes through this region. The application of modern agriculture techniques has resulted in to development in the cultivation of vegetable, fruits and fodder as the principle crops of the region today. The economic prosperity of this region has enjoyed during the past three decades and has leaded to increase urbanization and agro based industries. These several agro-based industries and small processing and repairing units have generated jobs for the people.

3. LESS DEVELOPED REGIONS:

This region covers most of Dindori, Kalwan, Satana and Deola and small portion of adjoining tahsils. This region has facilities of canal and well irrigation as it is trained by Girna, Punad, Mosam and Aaram rivers. Agricultural development commenced in this region following that Niphad and Malegaon. Development of fruits like Grapes and Pomegranate as well as vegetables cultivation are constantly underway in all the four tahsils. The marginal hilly tract in this tahsils with slopping soils cover could also be developed by cultivating fruits and such other plants. Thus this region has tremendous agricultural possibilities;

industrial development based on farm production and there fore rate of urbanization would increase in this region in future.

4. BACKWARD REGIONS:

It consists of Nandgaon, Yeola and Sinner and small portion of adjoining tahsils. It is characterized by coarse shallow soil and dryer climate. These tahsils are logging behind due to lack of development of irrigation potential from Godavari and Girna rivers. Cultivation of agave and such other drought registrant useful varieties is the only answer to it.

5. MOST BACKWARD REGIONS:

This region consists of Peth, Surgana, Trimbak and Igatpuri tahsils. This region is characterized by hilly terrain of western ghat and heavy rainfalls and thick forest. Minimum agriculture development is possible along the slopping sides of the hills. Generally this region is well known for terraced farming. Peth, Surgana and Trimbak tahsils are away from highways and railways therefore; the prospects of development are very poor. It has few good roads but even then the resources of natural scenery could be developed for tourism. Forest based industries and terraced agriculture could be developed for improving the lot of these tribal people.

CONCLUSION

Population of Nashik district has been increased from 1960-61 to 2000-01. In 1960-61 the population of Nashik district was 1855246 while it increased and attained 4987923 persons in 2001(table 2.10). The average regional increase in population growth has been recorded 68.8 percent from 1960-1961 to 2000-2001. The district has good percentages of areas under net sown during the study period. It is above 50 percent of the total

geographical area (table 3.1). Out of the total net sown area of the district 8.4 percent area under net irrigation during 1981. Whereas, during 2001, 16.33 percent area under irrigation to the net sown area (table 5.3). About 7.93 percent of land has been increased under net irrigation during a span of twenty years. Population increased up to 68.8 percent but net irrigated area increased only 7.93 percent to the net sown area. It clearly shows that the ratio of increasing population and net irrigating land is not balanced.

South-western monsoon heavily fall on the Western part of the district. It can be possible to arrest water by constructing dams and prevent the waste water problem. That water can be diverted with the help of lift and utilize for this region, is one of the ways to solve the water problem in this region. Hydrologists also opine this. Problem of population explosion and variability of rainfall create problematic situation that is why not enough to think but must be act positively. To create and develop the enrich society and such water scare drought region only one option is available i.e. to save the waste water resource. There is no water availability in east flowing rivers. Dams cannot fill up completely that is why only solution is that turn the water of west-flowing river and this only the scientific solution on this problem.

SUGGESTION:

1. Percentage of net sown area goes on decrease. The lands required for urbanization including alignment of roads, should be obtained from the poor quality lands as far as possible.

2. Percentage of forest land is constant between the study periods, but the density of trees goes on decrease. For this, the plans of forestation should be followed.
3. People causing the eradication of eco-system and deforestation should be declared as criminals and they should be punished for causing scarcity of water and the reformation should be introduced in the irrigation act of 1976.
4. Percentage of irrigated land increase gradually, while percentage of population increase rapidly. The explosion of population should be considered as the main cause of disparity and disorientation between available resources and ever increasing needs and accordingly severe legal steps should be taken in order to control over population.
5. Percentage area under oilseeds, Jawar, pulses, wheat and nachani goes on decrease, while percentage area of vegetable, fodder, fruits, sugarcane and rice goes on increase. The awareness programme should be started for the nutritional balance.
6. According to the levels of agriculture development;
 - a) Peth and Surgana tahsils comes under **backward category**. These tahsils having hilly area, forest covered land, heavy rainfall, and the tribal population is more in these tahsils, therefore there is no chance in the agricultural process and development. Agriculture is not possible in these tahsils, but these tahsils are important for water resources and natural scenery. There should be an opportunity for the development of tourism activity.
 - b) Dindori, Kalwan, Satana, Nandgaon and Sinner these five tahsils are the **potential tahsils**. However if there is careful

planning and management of water resources these tahsils can be put to better use agriculturally and socio-economic development is possible in these tahsils.

c) Nashik, Niphad, Malegaon, Chandwad, Igatpuri and Yeola tahsils are identified as **developed tahsils**. All these tahsils have a high percentage of net sown area under irrigation. There is an all-round development in agriculture in terms of poultry, dairy farming, truck-tractor farming, agro-based industries and mechanization with the advent of sugar factories, MIDC, agro-based industries. Leveled land, fertile soil, high percentage of irrigation, well developed transportation facilities, development of agricultural markets, awareness of modern agriculture, use of hybrid seeds, fertilizers, pesticides and insecticides in these tahsils is maximum. All these factors make the developed tahsils agriculturally more developed part of the district.

7. Jawar, oilseeds, wheat and pulses goes out in the competition for diversification, while vegetation, fodder, sugarcane, fruits enters in the competition for diversification. The awareness programme should be started for the nutritional balance and motivate the farmers to increase more land under oilseeds, wheat and pulses.

GENERAL SUGGESTION:

1. The available water resource should not be wasted and use properly.
2. The excessive use of water should be controlled by taking severe legal actions. The proportion of use of water should be based on where it is taken from and how, why and what is availability.

3. The under ground water level which has gone down should be maintained by taking ambitious projects like to store water for absorption. The development of catchment area should be started in large measure. The awareness raising programme should be started to maintain the use of underground water.
4. Various innovative techniques should be adopted to stop or decrease the evaporation of reservoir and irrigated zone.
5. The old method of irrigation i.e. block system should be regularized.
6. The planning of water should be based on river basins. Farmers should be taught to use the water carefully; they taught to be introduced to new methods of irrigation such as drip irrigation, sprinkle irrigation. The crop types should be based on availability of water.
7. The farmers should be inspired to use Poly-house techniques which would help to save water.