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Land Use Pattern and Agricultural Development in Kalwan Tahsil of Nashik District in Maharashtra State



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ABSTRACT

The present paper aims to analyse the land use patterns and agricultural development. The land use pattern has been grouped in four categories. Viz. 1) Agriculture Land 2) Area not available for cultivation 3) Cultural waste 4) Forest. The arrangement of land units in various categories based upon the properties of land or its suitability for some particular purpose. Generally, Land is used for different activities e.g. agricultural activities, forest, livestock, Settlements, construction of road etc. Agriculture is a major and primary economic activity of man in Kalwan Tahsil, nearly 90.73% of the total population of the Kalwan Tahsil is directly or indirectly engaged in agriculture. The agriculture is significantly affected by slope. Slope plays a significant role in the development of landform. It is a function of the interaction of many factors like lithology, structure, drainage, relief, denudation process, soil, climate and vegetation cover. In the present investigation, some variables are considered to determine the status of agricultural development. The irrigation is basic demand for the agricultural development. At present Tahsil development largely depend on agricultural. Kalwan Tahsil belongs to Nashik district of Maharashtra. It extent between $20^{\circ} 20' 15''$ to $20^{\circ} 40' 23''$ North latitude and $73^{\circ} 45' 6''$ to $74^{\circ} 05' 22''$ East Longitude and covers an area 89259.59 Hectares land of Nashik District in western side of the Maharashtra state. As per 2011 census, population is 208,422. For administrative purpose, the Tahsil divided into four revenue circles i.e. Namely Kanashi, Mokbhanagi, Abhona and Kalwan. Physiographically, Tahsil can be divided into two subdivisions namely Sahyadri hill complex and upper Girana Basin. Tahsil comes under the Monsoonal deciduous forest regime.

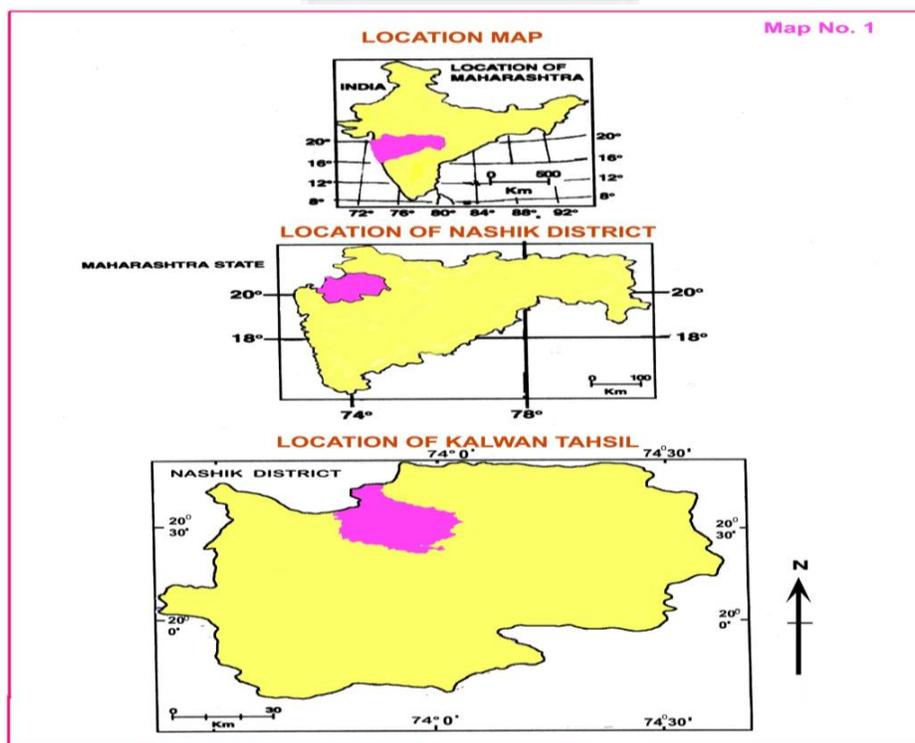
1) INTRODUCTION

The arrangement of land units into various categories based upon the properties of land or its suitability for some particular purpose. Generally, land used for different activities e.g. agricultural activities, forest, livestock, settlement, construction of road etc.

Kalwan is a Tahsil of Nashik district in the Indian state of Maharashtra. The total population of Kalwan, as per the 2011 Census is 208,422. The literacy is 57.52 percent, 56.84 for males and 43.16 for females.

2) Study area:

Area under present investigation includes Kalwan Tahsil of Nashik district. Kalwan Tahsil situated in the Punad & Girna sub-basin of Tapi basin. It extends between $20^{\circ} 20' 15''$ - $20^{\circ} 40' 23''$ N.lat and $73^{\circ} 45' 6''$ - $74^{\circ} 05' 22''$ E. long. Covers 86670.64 Hectares area. Administratively, Tahsil divided 4 circles i.e. Kanashi, Mokbhanagi, Abhona & Kalwan, 35 sub-divisions including total 144 villages. Tahsil surrounded by Dang district of Gujarat state on North West, Surgana Tahsil of Nashik district to the west Dindori Tahsil of Nashik district of south-west, Dewala to east and Baglan Tahsil on the north.



3) Objective:

The main objective of the present investigation is to assess the relationship between land use pattern and agricultural development, to understand the land use and agricultural development in Kalwan Tahsil of Nashik district, and to examine the existing land use and its spatial characteristics.

4) Database and Methodology:

The data of the various use of land has been collected from the Tahsil office, District statistical abstracts, District Gazetteer and Nashik district census handbook of 2011. Apart from these some of the data also have been generated from the field survey by adopting the various statistical techniques and charts, graphs and maps prepared.

Table No:-1. Various uses of land in Kalwan Tahsil as compare to Nashik District (2011 Census)

| Sr.No | Land use | Kalwan Tahsil | | Nashik District | |
|-------|------------------------------------|---------------|-------|-----------------|-------|
| | | Hectares | % | Hectares | % |
| 1 | Forest | 33040.71 | 83.13 | 327818.32 | 21.67 |
| 2 | Agricultural | 41581.43 | 47.98 | 926714.02 | 61.25 |
| 3 | Cultural waste | 1443.63 | 1.67 | 93424.21 | 6.18 |
| 4 | Area not available for cultivation | 10604.87 | 12.23 | 164880.69 | 10.9 |
| | Total geographical area | 86670.64 | 100 | 1512837.24 | 100 |

For the understanding of land use changes of Kalwan Tahsil land use data for previous decades also have been collected from the census between the period of 1971 and 1991, 2011. However Kalwan Tahsil came into existence as separate Tahsil & bifurcated from Dewala in 1999. For the sake convenience only present villages are considered for the census 1971 and 2011.

Table No: - 2 Land use change from census 1971 to census1971, 2011

| Sr. No | Census year | Total Area in Hectares | No. of Village | Forest Land | | Agriculture Land | | Cult. Waste | | Area not Available For cultivation | |
|--------|-------------|------------------------|----------------|-------------|-------|------------------|-------|-------------|------|------------------------------------|-------|
| | | | | Area | % | Area | % | Area | % | Area | % |
| 1 | 1971 | 85208.42 | 130 | 32068.8 | 37.64 | 43777.01 | 51.38 | N.A | -- | 9362.61 | 10.98 |
| 2 | 1981 | 85080.51 | 132 | 30474.2 | 35.82 | 38859.31 | 45.67 | 4029.95 | 4.74 | 11717.05 | 13.77 |
| 3 | 1991 | 86670.64 | 144 | 33040.7 | 38.13 | 41581.4 | 47.98 | 1443.63 | 1.66 | 10604.87 | 12.23 |
| 4 | 2011 | 89267 | 150 | 34044 | 38.13 | 44306 | 49.63 | 2200 | 2.46 | 8717 | 7.78 |

The area under forest in Kalwan Tahsil is 37.64 % during 1971 the forest in this region however 1971 to 1981 the forest is decreased by -1.82. It is due to putting forest land under cultivation.1991 to 2011forest land is constant. This cultivation is mostly of shifting type of cultivation and hence negative changes of forest land are temporary considerable area in this forest. Shifting cultivation was practiced in considerable area of forest and hill slope. The forest starts its growth after abandonment of the shifting cultivation consequently during 1981 to 1991.Forest land increase, hence positive change of forest during in this period.

The agriculture land declined from 1971 to 1981.During this period agriculture land decreased by -4.91 thousand hectares increase in area not available for cultivation it means that it is due to various infrastructure facilities to take care of increasing population namely settlement, road, car track, irrigation network, houses, school, market yards etc.

Land use changes:-

The table No.1 reveals various uses of land in Kalwan Tahsil as well as in the Nashik district. The total geographical area of the Kalwan Tahsil is 86670.64 hectares. Out of which only 41581.43 hectares or 47.98% of the total land is used for agriculture. As the compare to the Nashik district, it is 926714.02 hectares or 61.25%.It means that overall in a Nashik district agriculture is more than 60% wherein Kalwan Tahsil agricultural is less 50%.However, the forest

area covers 33040.71 hectares of land i.e. 38.13%, the forest cover of the district as whole only 21.67% it is absolutely greater than the district forest cover.

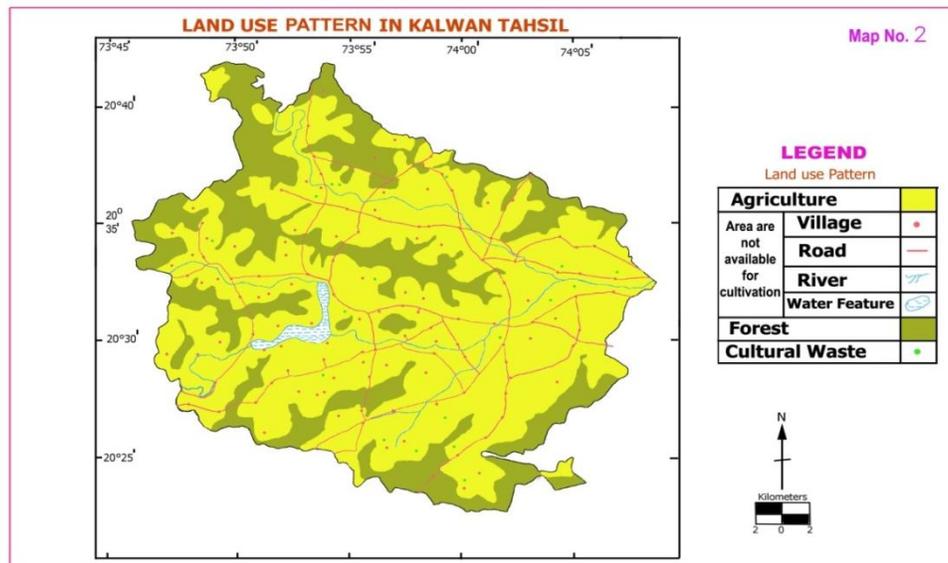
The fact clearly indicates that economy of the Tahsil is not only based on agriculture but also on forest. The forest is equally important as agriculture. The lifestyle is rural as well as tribe. Besides, there appears a significant impact of forest on agriculture. The magnitude of forest is high in Kalwan Tahsil due to Sahyadris hills and plateau. The cultural wasteland is very less in Kalwan Tahsil (1.67) than the Nashik district (6.81) this fact clearly indicates the cultural backwardness of the Kalwan Tahsil in Nashik District. The land not available for cultivation is greater than the District i.e. For Kalwan it is 12.23% and for Nashik district it is only 10.9% the fact suggest that agricultural in Kalwan Tahsil is limited by certain factor. The most significant is the slope, because there is no agricultural land beyond the 14 degree slope. The can be concluding remarked nature of the slope decides the land use pattern in Kalwan in Tahsil. The Kalwan Tahsil is divided into four revenue circles viz.kanashi, Mokbhanagi, Abhona & Kalwan in which, land use distribution is given in the following table No.3:

Table No: - 3. Distribution of land use in Kalwan Tahsil

| Sr.No | Land use | Kanashi | Mokbhanagi | Abhona | Kalwan | Total |
|-------|------------------------------------|----------|------------|----------|----------|----------|
| 1 | Forest | 11181.3 | 6831.39 | 7944.07 | 7083.95 | 33040.71 |
| 2 | Agricultural | 9715.97 | 10762.51 | 10681.01 | 10421.94 | 41581.43 |
| 3 | Cultural waste | 637.36 | 253.12 | 76.91 | 476.24 | 1443.63 |
| 4 | Area not available for cultivation | 2736.24 | 3300.83 | 2264.07 | 2303.73 | 10604.87 |
| 5 | Total | 24270.87 | 21147.85 | 20966.06 | 20285.86 | 86670.64 |

From the above table it is evident that the Kanashi circle reveals maximum forest area, which is 1/3 of the total forest area of the Kalwan Tahsil. The agricultural land is the minimum in the same circle. The remaining three-circle show comparatively higher agricultural area than forest. The Kanashi circle is more backward than the remaining three circles. The maximum agricultural and is found in the Mokbhanagi circle it also reveals minimum forest area. It is the most culturally developed area of the Kalwan Tahsil. Kanashi lies in the western part of the Tahsil in

the western Ghat region characterized by accelerated erosion and high proportion of barren outcrops of basalt.



Agricultural Development:-

Agricultural development is unquestionably a multidimensional concept of which slope is a vital aspect the levels of agricultural development have been determined on the basis of ten variables viz.

1. X1= % of the grass cropped area to the total geographical area.
2. X2= % of net sown area to gross cropped area.
3. X3= Cropping intensity.
4. X4= Irrigated area as percentage of total sown area.
5. X5= % of fallow land to the total geographical area.
6. X6= % of area not available for cultivation to the total geographical area.
7. X7= % of literate population to the total population.
8. X8= % of the cultivators to total population.
9. X9= % of the agricultural labours to total population.

10. X_{10} = Average slope.

The present investigation is based on the secondary source of published data from Tahsil office of a Kalwan for the year 2000-2001, 2011. The standard Z-Score technique has been applied.

$$\text{i.e. } Z \text{ score} = \frac{X_i - \bar{X}}{\sigma} \text{ ----- (1)}$$

Where Z = Standard score for observation.

X_i = Original value of observation.

\bar{X} = Mean for the all values of X.

σ = Standard deviation of X.

Apart from these results of standard score obtained for different indicators, a composite score also have been estimated as expressed by following formula:

$$CSS = \frac{\sum Z_{ij}}{N} \text{ ----- (2)}$$

Where Z_{ij} = Z score of ten Variables.

N = Total number of variables.

In order to classify the villages of Kalwan Tahsil according to the levels of agricultural development, the composite scores are divided in to the following three classes:

Table No.4: - Special patterns of agricultural development.

| Agricultural Development | Range of composite score | Village |
|--------------------------|--------------------------|---------|
| a) High | >+0.5 | 05 |
| b) Medium | 0.00 to 0.5 | 56 |
| C) Low | <0.00 | 83 |

a) High developed area:-

Only five villages out of 144 (3.47%) are agriculturally well developed. All these villages lie on the fertile alluvial tract of both the bank of river Girana. It means that this is the village of landlords.

b) Marginal developed area:-

56 villages out of 144(38.89) are on the margin of the development. This village is marginal only because of lack of irrigation facilities. Much of village lie on alluvial tope slope.

c) Low developed area (Agriculturally backward area):-

More than 50% villages lie under the low level of agricultural development. All are cultivators but they are practicing shifting and migratory cultivation. The higher slope is main barrier for the agricultural development. The terrace cultivation is practiced in this region.

CONCLUSION

The relation has been established between land use pattern and agricultural development. The major emphasis is laid on to establish the relation between slope and land use. Agricultural land is available at 49.6%. Shifting cultivation was practiced in considerable area of forest and hill slope. Agricultural is a major and primary economic activity of man. Nearly 90.73 of the total population of the Kalwan Tahsil is directly or indirectly engaged in agriculture.

The pattern of agricultural development is not uniform in all villages of Kalwan Tahsil. The central level alluvial track in the Girana-Punad Basin enjoys high level of agricultural development. Only 5 villages and this account 3.47% of the total village if the Kalwan Tahsil 56 village lie on pediment as will on the border of the level alluvial tract. They are in medium level of development. The large number of villages are in a low level of agricultural development (57.64%) lie on the pediments.

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