

## Dynamics of land use pattern in Maharashtra, India

PRESHITA TAKLE, P. D. VEERKAR, S.S. BHOSALE\* AND D. B. MALVE

Department of Agril. Economics, Dr. B. S. Konkan Krishi Vidyapeeth, Dapoli, RATNAGIRI (M.S.) INDIA

### ABSTRACT

The present study was undertaken with the broad objectives Viz. to study the temporal changes in land use and to estimate trends in different land use categories. For this, secondary data on land use statistics for 30 year's period from 1970 – 71 to 1999 – 2000 were collected from different publication of Government of Maharashtra. For observing decadal changes, the data were grouped under three decade. The findings of the study showed that the land use pattern of Maharashtra was dominated by different crops (57.34%) followed by area under forest and fallow land (7.67%). Regarding temporal changes in different land use categories, it was observed that, the proportionate area in each decade under different categories was remain more or less same with meager changes in each decade. As far as rate of growth was concerned, it was observe that, over a period of time positive and significant growth observed in case of land under non agriculture uses (1.46%), land under miscellaneous tree crop (1.65%) and both the fallow (3.24%) while negative and significant growth was observe in forest land (-0.16%) barren and uncultivable land (-0.49%) and permanent pasture land (-1.47%). The dynamics of shift in land use indicated that about 5 lacks ha. area was shifted from ecological sector of which 76 per cent area was shifted towards non – agriculture sector and only 24 per cent area to agriculture sector. On the whole, the study concluded that, in Maharashtra the area under ecological sector is decreasing very fast which responsible for disturbing the ecological balance as well as land productivity.

**Key words :** Dynamics, Land use pattern, Temporal change, Fallow land, Ecological sector.

### INTRODUCTION

Generally land denotes the surface of the earth, the soil or the ground. The concept of land use has been define in various ways by many geographers. Souer define, "land use as the use to which the entire land surface is put". Stamp (1962) stated that "land as a whole must be so used as to satisfy as many as possible of the needs of legitimate desires of the people of the nation as a whole. Land use in any region is influenced by physical and socio-economic environment. Under utilization, over-utilization and mis-utilization are the three common problems in the utilization of common property. The land available for agriculture and other purposes is limited. The over increasing pressure of population, decreases land man ratio which forced to shift in area under different land use categories. Considering these all the aspects, the land use dynamics in Maharashtra was studied with the objectives 1) To study the temporal changes in land use. 2) to estimate trends in different land use categories and 3) to study the dynamics of shift in land use.

- 1. Period I : 1970-71 to 1979-80
- 2. Period II : 1980-81 to 1989-90
- 3. Period III : 1990-91 to 1999-2000
- 4. Overall period : 1970-71 to 1999-2000

To know the growth in area under different categories of land in Maharashtra State, compound growth rates were estimated with the help of exponential function of the following type

$$Y_t = ab^t \dots\dots\dots (1)$$

Where,

- $Y_t$  = Area under a particular category of land in a particular region in the year 't'
- a = Intercept
- t = time period
- b = estimated coefficient

The compound growth rate in each land use category was estimated by using following equation.

$$r = (\text{Antilog } b - 1) \times 100$$

Where,

- r = Compound growth rates (CGR) is percentage term
- b = Estimated coefficient in the exponential function

### Source of data Analysis of data

For studying temporal changes in land use pattern, growth rates of land use category as well as shifts in land use pattern the data were grouped into following four periods.

\* Author for correspondence.

**Land use dynamics model**

To study dynamics of shift in land use category the Land Use Dynamics Model of the following type as given by Pandey and Tewari (1987) was used.

**Model**

$$R = Fr + P + M + N + U + W + C + Fe + Fo \quad \dots(1)$$

Where,

- R = Total reported area
- Fr = Area under forest
- P = Area under permanent pasture
- M = Area under miscellaneous tree crops
- N = Area under non-agricultural use
- U = User and barren lands
- W = Culturable waste lands
- Fc = Current fallows
- Fo = Fallow land other than current fallow
- C = Net area cultivated

In the estimation of above model and in all the estimations the area is taken in hundred hectares.

The total land area of the state is more or less constant, the land use changes can occur only through inter class transfer and hence, the land use changes over time are linearly additive. Thus, the accounting identify for land use changes can expressed as,

$$\Delta R = \Delta Fr + \Delta P + \Delta M + \Delta N + \Delta U + \Delta W + \Delta Fc + \Delta Fo + C \quad \text{-----}(2)$$

For studying the sectoral dynamics total land endowment is conveniently grouped into following three broad sectors

- i) Ecological sector (E) Comparising Fr, P, M, U
- ii) Agricultural sector (A) Comparising U, C, Fc, Fo
- iii) Non-agricultural sector (N) Comparising of only NA

Ecological sector is further divided into two sub-groups as

- a) Desirable ecology ( $E_1$ ) Comparising Fr, P, M
- b) Undesirable ecology ( $E_2$ ) Comparising U

The net changes within each sector can be grouped as :

$$DE = DE_1 + DE_2 = (DFr + DP + DM) + (DU) \quad \dots (3)$$

$$DR = DFc + DFo + DW + DC \quad \dots (4)$$

$$DR = DE_1 + DE_2 + DA + DN \quad \dots (5)$$

Accordingly changes in different sectors are worked out and budgeted as per the identities (3), (4) and (5). This budgeting facilitated the analysis of direction of land use shifts in their dynamics in Maharashtra.

**RESULTS AND DISCUSSION****Temporal changes in land use pattern**

To study the changes in land use pattern over a period of time as well as in different decades the percentage of area under different categories of land use to the total reported area of Maharashtra was worked out and results are presented in Table 1.

Table 1 : Temporal changes in land use pattern in Maharashtra State

(Figures are percentage to reported area)

S. No.	Land use class	1970-71	1980-81	1990-91	2000-2001
1.	Forest	17.66	17.32	16.70	17.22
2.	Barren and uncultivable land	5.86	5.70	5.30	5.51
3.	Land put to non-agricultural uses	2.81	3.41	3.60	4.23
4.	Culturable waste	4.84	3.23	3.10	2.94
5.	Permanent pasture and grazing land	5.42	5.10	3.60	4.36
6.	Land under miscellaneous tree crops and groves not included in net area sown	0.67	0.69	0.98	0.73
7.	Current fallows	2.67	2.80	2.92	3.86
8.	Other fallows	2.66	3.26	3.45	3.81
9.	Net area sown	57.41	58.55	58.32	57.34
	Reported area	100	100	100	100
		(307583)	(307583)	(307583)	(307583)

(Figures in the parentheses are reported area in '00' ha)

It is observed from Table 1 that, in the year 1970-71, out of the total reported area of the Maharashtra, maximum area was under various crop (57.41%), followed by area under forest (17.66%), Barren and uncultivable land (5.86%) and permanent pasture (5.42%). The proportion of area under remaining land use categories ranged in between 0.67 per cent under miscellaneous tree crops and groves and 4.84 per cent under culturable waste land.

Considering decadal changes in land use, increasing proportionate share was observed in case of land put to non-agricultural uses and in both the fallow land. However in case of barren and uncultivable land and permanent pasture land decreased proportion was observed. Area under forest was continuously decreased upto 1990-91 and again marginal increased was observed in 2000-01. The analysis also indicated that in different periods of time the pattern of proportionate area under each land use category was remained more or less same with marginal changes in each period of time.

### **Trends in land use pattern**

The estimated compound growth rates for land use categories in Maharashtra State are given in Table 2.

0.02 %) which recorded negative but non-significant growth. Among the negative growth, highest being observed in permanent pasture land (-1.47%) and lowest being in net cropped area (-0.02%). In period second and third, continuous negative growth was observed in case of cultural waste land. On the contrary, continuous positive but decreasing growth was recorded only in case of land put to non-agricultural uses. In remaining categories mixed trend was observed in these decades.

### **Dynamics of shift in land use**

For studying dynamics of shift in land use, the whole land resource was grouped under three broad sectors viz., (1) Ecological sector (E), (2) Agricultural sector (A), (3) Non-agricultural sector (NA), The ecological sector is sub-divided into (a) Desirable ecology ( $E_1$ ), (b) undesirable ecology ( $E_2$ ). As per identities of shift in area in different sector as well as compound growth rate was carried out and presented in Table 3.

It is observed from Table 3 that over a period of 30 years 494000 ha area was shifted from ecological sector towards agricultural and non-agricultural sector. But the shift in area towards agricultural sector was comparatively less (24%) than that of non-agricultural sector. This is

Table 2 : Compound growth rates of land use categories in overall Maharashtra State

S. No.	Land use class	Period			Overall
		I	II	III	
1.	Forest	-0.22**	-0.32**	0.34**	-0.16**
2.	Barren and uncultivable land	-0.41**	-0.90**	0.06 <sup>NS</sup>	-0.49**
3.	Land put to non-agricultural uses	2.07**	-0.99**	1.75**	1.46
4.	Culturable waste	-4.55**	-0.14 <sup>NS</sup>	-0.52*	-0.94**
5.	Permanent pasture and grazing land	-0.65**	-3.73**	1.28**	-1.47**
6.	Land under miscellaneous tree crops and groves not included in net area sown	0.022 <sup>NS</sup>	2.46 <sup>NS</sup>	-0.92 <sup>NS</sup>	1.65**
7.	Current fallows	-0.26 <sup>NS</sup>	3.91 <sup>NS</sup>	0.65 <sup>NS</sup>	1.35**
8.	Other fallows	1.19*	-1.12 <sup>NS</sup>	1.93*	1.89**
9.	Net area sown	0.31**	0.29**	-0.42**	-0.02 <sup>NS</sup>

(\*\*, \* significant at 1% and 5% level of probability)

From Table 2, it is observed that over a period of time (1970-71 to 1999-2000) significant and positive growth was observed in land put to non-agricultural uses (1.46%), land under miscellaneous tree crops and groves (1.65%) and both the fallow land (3.11%).

However, negative and significant growth was seen in all the remaining categories except net area sown (-

also supported by higher rate of CGR (1.46%) in area shifting towards non-agricultural sector. This shift towards non-agricultural sector was mainly because of urbanization and industrial expansion. The another reason for this are expansion in irrigation project, market yard and roads which forms the supporting infrastructure of agricultural growth of the particular region. However, this

Table 3 : Dynamics of shifts in area in different sectors with their compound growth rate

S. No.	Sectors	Shift in area (00' ha)	CGR
1.	Non-agricultural sector (NA)	3750	1.46**
2.	Desirable ecology (E <sub>1</sub> )	(-)3820	(-)0.37**
3.	Undesirable ecology (E <sub>2</sub> )	(-)1120	(-)0.49**
4.	Agricultural sector (A)	1190	(-)0.08**

trend of shifting land from ecological sector to non-agriculture is not favourable, as it affects the ecological balance badly.

#### REFERENCES

- Pandey, V. K. and Tewari, S. K. (1987).** Some ecological implications of land use dynamics in Uttar Pradesh. *Indian Journal of Agricultural Economics*, **42(3)**: 388-394.
- Pandey, V. K. and Tewari, S. K. (1996).** Regional Agricultural Land use. A sectoral aggregate yield. *Indian Journal of Agricultural Economics*, **51(1 & 2)**: 260-269.
- Stamp, L.D. (1962).** The land of Britain. It's use and misuse. Longmans Publications, London.

---

Received : June, 2006; Accepted : January, 2007