

# ***THE INTERNATIONAL JOURNAL OF HUMANITIES & SOCIAL STUDIES***

## **Spatial Analysis of Land Use Change and Crop Land Use Pattern in Uttar Pradesh**

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### **Abstract:**

*Land use is the human use of land. Land use involves the management and modification of natural environment or wilderness into built environment such as settlements and semi-natural habitats such as arable fields, pastures, and managed woods. It also has been defined as "the arrangements, activities and inputs people undertake in a certain land cover type to produce, change or maintain it" (FAO, 1997a; FAO/UNEP, 1999). [1]. Land is the most significant as by far the larger proportion of inhabitants depend to carry out economic activities on it. Land use presents an extremely complex pattern, falling into different types. The land use pattern which emerges in any area is resulted in by human settlement and its development represents due to the interaction of physical, historical, and socioeconomic factors. Any increase and decrease in area under cultivation and in net sown area reveals the changes that have taken place in land use pattern. To identify the changes in land use and crop land use pattern, simple percentages have been considered Area under different land use categories and their percentages from geographical area during the period of 1996-2000 to 2001-2005.*

### **1. Introduction**

Many works have been done by geographers related to land use. Chatterjee, (1952) done land utilization survey of Howrah district (West Bengal). Shafi, (1969) presented a plan for land use and classified the land categories and their capability. Bolin, (1977) studied the land use change pattern and their importance for the carbon cycle. Kostrowicki, (1983) classified the land use categories and studied the land use system and its impact on environment. Lombin, (1997) explained the modelling and monitoring land cover changes processes in tropical regions. Pandey, R.K. (2000), has discussed the land use and cropping pattern of Eastern Uttar Pradesh. Cihlar & Jansen, (2001) has presented a study on efficient land use mapping over large areas". Kushwaha, (2008) has presented an important review on land use pattern. Singh, S.P., Singh, A.K. & Dwivedi, S. (2010) has analyzes the land use pattern, Cropping pattern, Intensity and coverage under vegetable crops in different farm size groups in Eastern Uttar Pradesh. Tonape, L.B. & Barakade, A.J. (2011) has analyzed the agricultural land use pattern at micro level in Satara district (Maharashtra). This study gives a base for study of agricultural land use. A handful works also have been done in Banaras Hindu University. Singh, (1962) studied Land utilisation in Chakia

tahsil of Banaras district (U.P.). Mishra, (1966) worked on recent change in land use in the Tarai Region of Uttar Pradesh. Singh, (1970) focused on land use pattern in Mirzapur and its environs. Singh, (1972) traced out Changes in the land use pattern after consolidation in Jaunpur Tahsil. Singh, (1989) studied the land use in Tarai region of Uttar Pradesh. Chandel, (1989) worked on the agricultural changes in Konch block, district- Jalaun (Uttar Pradesh). Prasad, (1989) studied the relation between land use and settlement planning in Gyanpur tahsil (district- Varanasi). Tripathi, (1999) worked on agricultural development and planning in Faizabad district. Prasad, (2006) presented an analysis on land use change and environmental degradation in Dhanbad district (Jharkhand).

#### **1.1. General Land Use Pattern**

Land is the most significant as by far the larger proportion of inhabitants depend to carry out economic activities on it. Land use presents on extremely complex pattern, falling into different types. The land use pattern which emerges in any area is resulted in by human settlement and its development represents due to the interaction of physical, historical, and socioeconomic factors.

Any increase and decrease in area under cultivation and in net sown area reveals the changes that have taken place in land use pattern. Area under different land use categories and their percentages from geographical area during the period of 1996-2000 to 2001-2005, show its significance in the state of Uttar Pradesh. The general land use pattern can be considered with reference to the following land use categories.

- i. Area under forests.
- ii. Barren lands.
- iii. Land under non-agricultural uses.
- iv. Culturable waste lands.
- v. Permanent pasture lands.
- vi. Land under miscellaneous uses.
- vii. Current fallow lands.
- viii. Other fallow lands.
- ix. Net sown area.

Land use in the state of U.P has been considered for two periods of time extending from 1996-2000 to 2001-2005 as shown in Tables 1 and 2.

**1.1.1. Area under Forests**

This includes all lands classed as forest under any legal enactment dealing with forests or administered as forests, whether state-owned or private, and whether wooded or maintained as potential forest land. The area of crops raised in the forest and grazing lands or areas open for grazing within the forests remain included under the forest area.

The area under forests in the state occupied 4499.55 thousand ha. (15.69 percent) as the total reported area under forest during 1996-2000 but during the period of 2001-05, it decreased from 4499.55 thousand ha. (15.69 percent) to 1687.98 thousand ha. (6.97 percent). The area under forest shows declining trend mostly in the districts of Pilibhit, Saharanpur, Bulandshahar, Mirzapur, Sonbhadra, Maharajganj, Gonda and Bahraich but the districts of Muzaffarnagar, Meerut, Agra, Bijnor, J. P. Nagar, Etawah, Kannauj, Kanpur (rural), Allahabad, Chitrakut, Lucknow and Shrawasti shows area under forest has increased.

Area under forests in mainly covered with the tree spices of silver fir, spruce, deodar, chir, oak, sal, gigantic holdu, shisham, dhok, teak, mahua, Salai, chironji, tendu, khan, babul, and semal, some of the grasses baib and bamboo are also seen over the vegetative cover.

**1.1.2. Barren Lands**

Barren lands are those lands which not suited for cultivation and they are unproductive because of relief with rocky ground base. These areas can not be brought under plough except with high input cost with possibly low returns. This includes all barren and unculturable land like mountains, deserts, etc. Land which cannot be brought under cultivation except at an exorbitant cost, should be classed as unculturable whether such land is in isolated blocks or within cultivated holdings. Such land may be used for the construction of building whenever possible. The occurrence of barren lands in the state show a decline from 889.24 thousand ha. (3.10 percent) during the period of 1996-2000 to 573.17 thousand ha. (2.37 percent) during 2001-05. The declining trend in area under barren lands is most prominently in the districts of namely G.B. Nagar, Aligarh, Hathras, Agra, Firozabad, Mainpuri, Bareilly, Rampur, Farrukhabad, Kannauj, Kanpur (rural), Allahabad, Mahoba, Banda, Chitrakut, Mirzapur, Sonbhadra, Ballia, Deoria, Lucknow, Unnao, Raebareli and Barabanki but area under barren land shows increasing trend in the districts of Etawah, Varanasi and Faizabad.

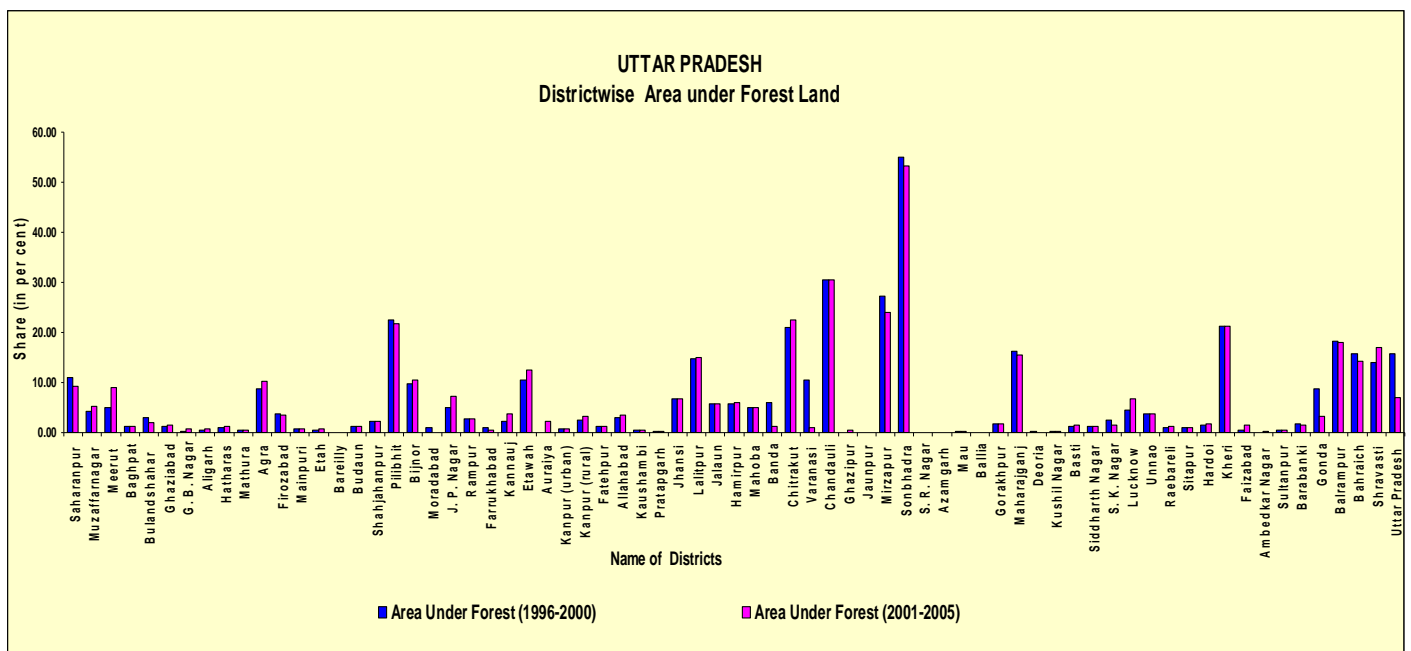


Figure 1  
Source: Prepared by the Author.

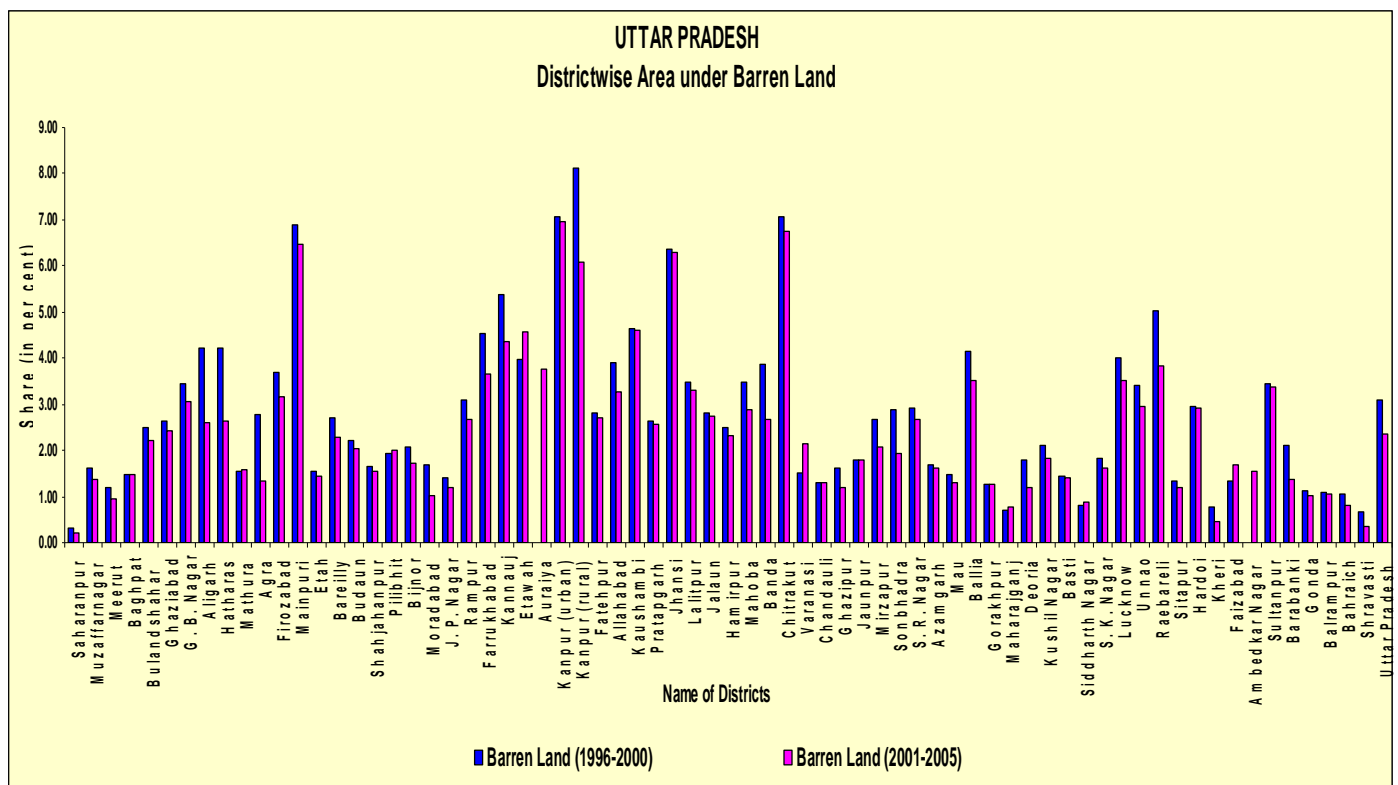


Figure 2

Source: Prepared by the Author.

### 1.1.3. Land under Non-Agricultural Uses

Land under non-agricultural uses include the area under buildings and factories, water bodies (river, lakes, canals, tanks, ponds, etc.), roads and railways. Area under non-agricultural uses has increased from 2517.73 thousand ha. (8.78 percent) during the period of 1996-2000 to 2549.24 thousand ha. (10.53 percent) during the period of 2001-05. Area under this category shows increasing trend in all the districts of the state except the five districts namely Kanpur (rural), Kaushambi, Pratapgarh, S. R. Nagar and Faizabad shows area under non-agricultural uses has decreased.

### 1.1.4. Culturable Waste Lands

This category of land use includes the lands which are not in use due to lack of irrigation, the effect of salinity or alkalinity in soil, soil erosion and water logging. The extent of culturable waste land has increased from 251.06 thousand ha. (0.88 percent) during 1996-2000 to 494.81 thousand ha. (2.04 percent) during 2001-05 in the state. All of the districts of the state show a declining trend in area under culturable wastelands, but the largest decline are in the districts of Etah, Farrukhabad, Jhansi, Lalitpur, and Chitrakut.

### 1.1.5. Permanent Pastures and Other Grazing Lands

This includes all grazing lands, whether they are permanent pastures and meadows or not. Village common grazing land is included under this head. The area under pastures and grazing lands is not very much significant, which accounts for only less than 1 percent of the total reporting area during the periods of study in the state. This trend of decrease under this category in area is mainly due to an increasing demand to grow more food crops and for land reclamation. The area under this category shows a declining trend from 251.06 thousand ha. (0.88 percent) during 1996-2000 to 67.82 thousand ha. (0.28 percent) during 2001-05. This category of land use shows a decline in area mainly in the districts of Muzaffarnagar, Ghaziabad, G. B. Nagar, Aligarh, Mathura, Firozabad, Etah, Budaun, Farrukhabad, Kannauj, Etawah, Kanpur (urban), Ghazipur, Mirzapur and Hardoi but the districts of Meerut, Lalitpur, Azamgarh, Raebareli, Faizabad, Sultanpur, Barabanki and Gonda show an increasing trend in area under permanent pastures and other grazing lands.

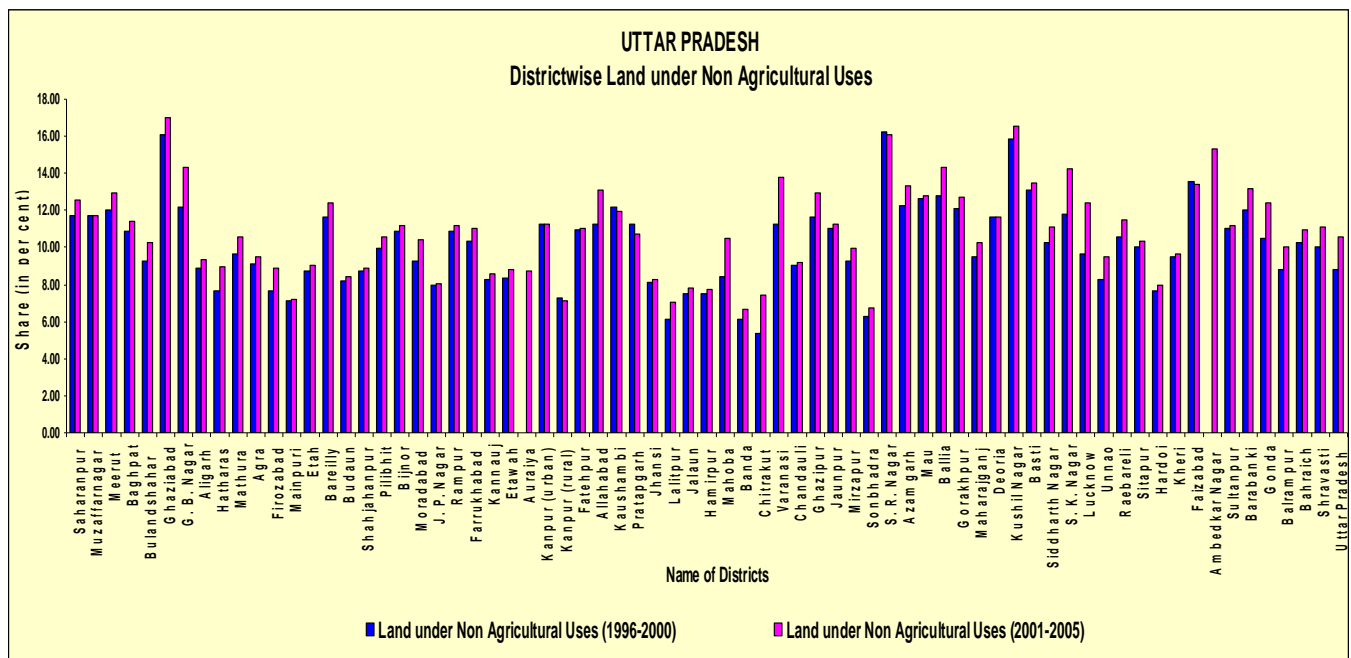


Figure 3  
Source: Prepared by the Author.

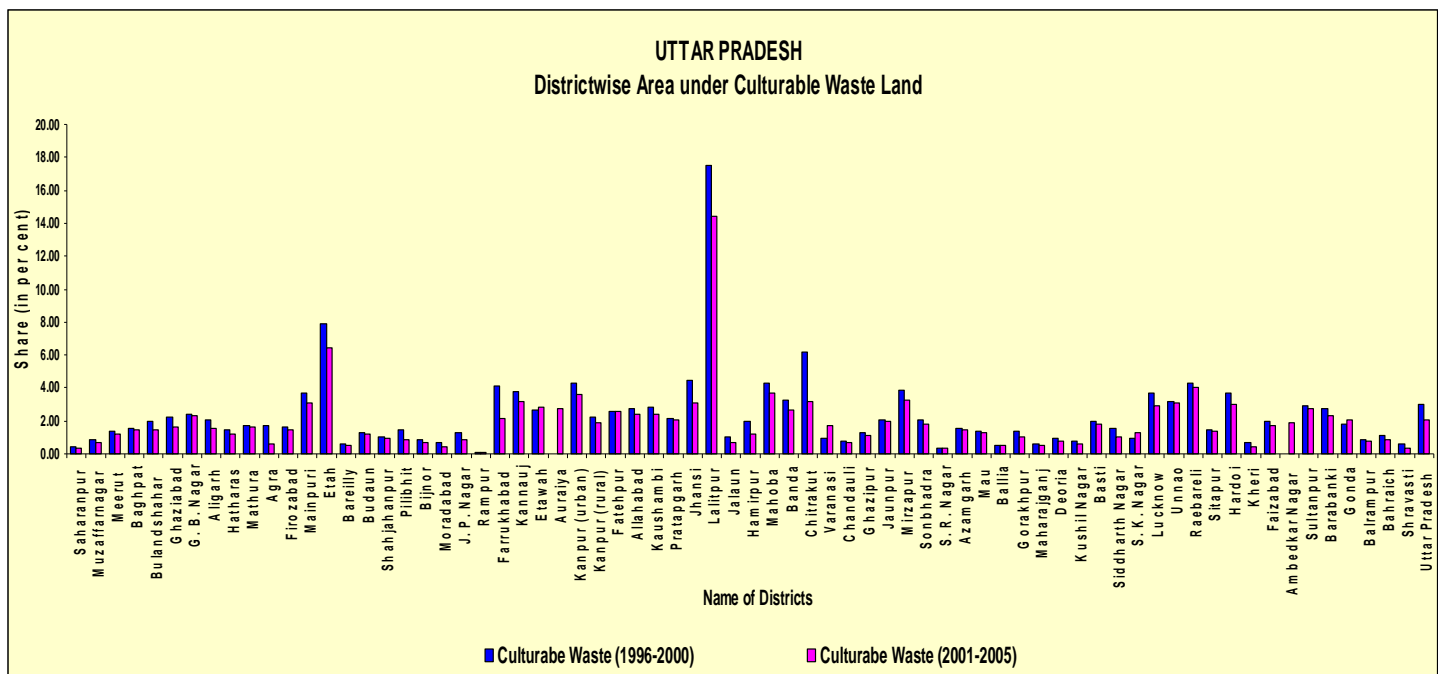


Figure 4  
Source: Prepared by the Author.

1.1.6. Land under Miscellaneous Uses

Land under miscellaneous uses includes tree crops and groves over the cultivable land. Area under net sown is not included in this category, but is put in some other agricultural uses. Area under miscellaneous trees and groves has decreased from 491.65 thousand ha. (1.71 percent) during 1996-2000 to 347.78 thousand ha. (1.44 percent) during 2001-05. Area under this category of land use show a decline in the districts of Etah, Budaun, Shahjahanpur, Bijnor, Moradabad, J. P. Nagar, Rampur, Farrukhabad, Kannauj, Etawah, Kanpur (urban), Kanpur (rural), Allahabad, Pratapgarh, Banda, Jaunpur, S. R. Nagar, Azamgarh, Gorakhpur, Siddharthnagar, Lucknow, Unnao, Hardoi, Barabanki, Gonda, Balrampur, Bahraich and Shrawasti. Area under miscellaneous uses show a increasing trend mainly in the districts of Bulandshahr, Agra, Firozabad, Mainpuri, Pilibhit, Kaushambi, Jalaun, Chitrakut, Varanasi, Mirzapur, Sonbhadra, Ballia, Kushi Nagar, Basti, S. K. Nagar, Raebarali and faizabad.

### 1.1.7. Current Fallow Lands

The current fallow lands comprise the cultivable area is kept free from cultivation in both the seasons (*kharif* and *rabi*) during the current year. Area under this category of land use has increased from 1046.61 thousand ha. (3.65 percent) during 1996-2000 to 1134.83 thousand ha. (4.69 percent) during 2001-05 in the state. Current fallow lands show a increasing trend in the districts of Ghaziabad,

G. B. Nagar, Agra, Mainpuri, Shahjahanpur, Moradabad, J. P. Nagar, Farrukhabad, Etawah, Kanpur (urban), Kanpur (rural), Allahabad, Pratapgarh, Jhansi, Lalitpur, Hamirpur, Varanasi, Ghazipur, Jaunpur, Mirzapur, Sonbhadra, S.R. Nagar, Azamgarh, Mau, Gorakhpur, Deoria, Kushi Nagar, Siddharthnagar, S.K. Nagar, Faizabad, Sultanpur, Barabanki, Balrampur and Bahraich and decreasing trend in area under current fallow lands found mainly in the districts of Firozabad, Budaun, Bijnor, Kaushambi, Jalaun, Mahoba, Banda, Chitrakut, Lucknow, Unnao, Sitapur, Kheri, Gonda and Shrawasti.

Area (in 000 ha.)

Name of District	Forest Lands		Barren Lands		Land Under non Agricultural uses		Cultural waste Lands		Permanent Pasture		Land Under miscellaneous Uses		Current Fallow Lands		Other Fallow Lands		Net Sown Area	
	Area	(%)	Area	(%)	Area	(%)	Area	(%)	Area	(%)	Area	(%)	Area	(%)	Area	(%)	Area	(%)
Saharanpur	40.19	11.06	1.18	0.32	42.72	11.75	1.55	0.43	0.19	0.05	1.06	0.29	2.78	0.76	1.18	0.32	272.56	75.00
Muzaffarnagar	17.61	4.27	6.65	1.61	48.30	11.71	3.37	0.82	0.47	0.12	1.49	0.36	5.26	1.28	3.48	0.84	325.70	78.99
Meerut	19.30	5.12	4.52	1.20	45.19	12.00	5.25	1.39	0.36	0.09	0.49	0.13	5.45	1.45	5.24	1.39	290.79	77.22
Bagpat	0.51	1.13	0.66	1.46	4.86	10.85	0.68	1.51	0.03	0.08	0.01	0.02	0.80	1.79	0.58	1.30	36.71	81.86
Bulandshahar	11.43	2.92	9.83	2.51	36.45	9.30	7.76	1.98	0.92	0.24	3.42	0.87	5.59	1.43	7.08	1.81	309.56	78.96
Ghaziabad	2.70	1.20	5.88	2.63	36.07	16.09	5.05	2.25	0.23	0.10	0.59	0.26	6.09	2.72	7.67	3.42	159.84	71.32
G. B. Nagar	0.40	0.21	6.70	3.46	23.59	12.18	4.73	2.44	0.69	0.35	1.97	1.02	8.88	4.59	8.41	4.34	138.35	71.42
Aligarh	1.95	0.46	17.88	4.23	37.59	8.89	8.68	2.05	2.11	0.50	0.62	0.15	5.75	1.36	10.96	2.59	337.15	79.76
Hatharas	1.95	1.09	7.56	4.22	13.65	7.63	2.64	1.48	1.01	0.56	0.36	0.20	2.16	1.21	3.85	2.15	145.78	81.46
Mathura	1.40	0.40	5.37	1.54	33.63	9.68	6.03	1.74	1.39	0.40	1.04	0.30	7.38	2.12	8.50	2.45	282.84	81.37
Agra	35.38	8.85	11.14	2.79	36.39	9.10	6.81	1.70	0.99	0.25	0.62	0.16	12.63	3.16	8.76	2.19	287.10	71.81
Firozabad	8.60	3.65	8.74	3.71	18.15	7.69	3.95	1.67	0.71	0.30	1.05	0.45	10.07	4.27	9.20	3.90	175.48	74.37
Mainpuri	1.92	0.70	18.92	6.89	19.56	7.13	10.09	3.68	1.41	0.51	1.91	0.69	10.66	3.89	21.51	7.84	188.42	68.66
Etah	2.57	0.58	6.88	1.55	39.00	8.76	35.15	7.89	0.96	0.22	1.98	0.45	18.03	4.05	22.72	5.10	318.13	71.42
Bareilly	0.26	0.06	11.10	2.72	47.49	11.65	2.58	0.63	0.54	0.13	2.21	0.54	6.97	1.71	6.30	1.55	330.06	80.99
Budaun	6.90	1.33	11.53	2.22	42.55	8.18	6.88	1.32	0.75	0.15	7.75	1.49	18.24	3.51	16.76	3.22	408.78	78.59
Shahjahanpur	10.01	2.24	7.44	1.67	38.88	8.71	4.70	1.05	1.02	0.23	4.80	1.07	16.54	3.70	8.24	1.84	354.93	79.48
Pilibhit	80.01	22.48	6.87	1.93	35.57	9.99	5.06	1.42	0.28	0.08	2.51	0.71	2.95	0.83	2.38	0.67	220.32	61.90
Bijnor	46.30	9.78	9.88	2.09	51.30	10.84	3.87	0.82	0.51	0.11	5.04	1.06	13.48	2.85	3.29	0.69	339.61	71.76
Moradabad	4.81	1.06	7.58	1.68	41.82	9.24	3.26	0.72	0.54	0.12	4.29	0.95	8.31	1.84	4.32	0.95	377.61	83.45
J.P.Nagar	11.86	5.02	3.30	1.39	18.85	7.97	3.03	1.28	0.21	0.09	1.32	0.56	4.70	1.99	2.75	1.16	190.35	80.54
Rampur	6.61	2.80	7.27	3.08	25.69	10.88	0.28	0.12	0.01	0.00	1.02	0.43	1.96	0.83	0.44	0.19	192.88	81.67
Farrukhabad	2.92	0.93	14.20	4.52	32.58	10.38	12.87	4.10	1.55	0.49	5.35	1.70	15.52	4.94	16.06	5.12	212.90	67.81
Kannauj	4.79	2.29	11.25	5.38	17.22	8.25	7.92	3.79	2.17	1.04	4.21	2.02	10.92	5.23	7.57	3.62	142.82	68.38
Etawah	46.32	10.48	17.52	3.96	36.91	8.35	11.70	2.65	2.08	0.47	5.68	1.28	15.93	3.60	13.94	3.15	292.12	66.06
Auraiya	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kanpur (urban)	1.57	0.71	15.65	7.07	24.91	11.25	9.54	4.31	3.65	1.65	4.05	1.83	13.76	6.21	9.44	4.26	138.80	62.70
Kanpur (rural)	9.69	2.46	31.99	8.13	28.65	7.28	8.93	2.27	0.53	0.13	4.98	1.27	20.12	5.11	18.00	4.58	270.61	68.77
Fatehpur	5.37	1.27	11.88	2.82	46.32	10.98	10.73	2.54	2.25	0.53	5.70	1.35	40.30	9.56	16.34	3.87	282.82	67.06
Allahabad	19.59	3.00	25.58	3.91	73.57	11.25	18.20	2.78	1.96	0.30	11.28	1.72	40.16	6.14	30.52	4.67	433.03	66.22
Kaushambi	0.64	0.48	6.21	4.64	16.28	12.17	3.84	2.87	0.32	0.24	2.65	1.98	10.26	7.67	5.20	3.89	88.40	66.07
Pratapgarh	0.54	0.15	9.54	2.63	40.92	11.28	7.92	2.18	0.74	0.20	16.70	4.61	50.27	13.86	16.52	4.56	219.47	60.52
Jhansi	33.69	6.74	31.80	6.36	40.52	8.10	22.49	4.50	0.62	0.12	1.50	0.30	19.87	3.97	8.00	1.60	341.75	68.32
Lalitpur	75.54	14.86	17.68	3.48	31.14	6.13	89.06	17.52	3.14	0.62	1.77	0.35	16.36	3.22	26.19	5.15	247.51	48.69
Jalaun	25.68	5.64	12.83	2.82	34.30	7.53	4.64	1.02	0.13	0.03	2.88	0.63	23.01	5.06	7.56	1.66	344.17	75.61
Hamirpur	26.94	5.65	11.87	2.49	35.70	7.49	9.38	1.97	0.45	0.09	0.87	0.18	16.72	3.51	9.80	2.06	364.86	76.56
Mahoba	11.93	4.98	8.31	3.47	20.17	8.41	10.39	4.33	0.31	0.13	0.63	0.26	7.98	3.33	6.19	2.58	173.82	72.50
Banda	35.00	5.98	22.74	3.88	36.08	6.16	18.94	3.23	0.42	0.07	4.47	0.76	28.88	4.93	22.84	3.90	416.19	71.08
Chitrakut	68.09	20.93	23.02	7.08	17.33	5.33	20.06	6.17	0.04	0.01	10.48	3.22	11.53	3.54	12.74	3.92	162.08	49.81
Varanasi	31.33	10.59	4.44	1.50	33.40	11.30	2.90	0.98	0.15	0.05	3.81	1.29	5.53	1.87	6.28	2.12	207.86	70.29
Chandauli	77.40	30.53	3.29	1.30	22.85	9.02	1.99	0.79	0.03	0.01	1.50	0.59	6.04	2.38	3.78	1.49	136.60	53.89
Ghazipur	0.00	0.00	5.37	1.61	38.88	11.67	4.33	1.30	0.94	0.28	3.64	1.09	11.65	3.50	4.98	1.50	263.41	79.05
Jaunpur	0.05	0.01	7.22	1.81	44.21	11.06	8.12	2.03	1.48	0.37	5.68	1.42	29.62	7.41	17.38	4.35	285.95	71.54
Mirzapur	126.16	27.36	12.29	2.66	42.72	9.26	17.65	3.83	0.90	0.20	10.59	2.30	18.37	3.98	20.57	4.46	211.87	45.95
Sonbhadra	376.26	54.90	19.65	2.87	42.96	6.27	14.33	2.09	0.21	0.03	6.39	0.93	19.59	2.86	20.00	2.92	185.98	27.14
S. R. Nagar	0.01	0.01	2.99	2.90	16.77	16.27	0.34	0.33	0.21	0.20	1.06	1.03	7.21	6.99	3.70	3.59	70.75	68.67
Azamgarh	0.10	0.02	7.18	1.69	51.84	12.23	6.38	1.51	1.30	0.31	8.75	2.06	29.67	7.00	11.12	2.62	307.65	72.56
Mau	0.56	0.33	2.52	1.47	21.67	12.63	2.33	1.36	0.22	0.13	3.74	2.18	8.15	4.75	4.65	2.71	127.78	74.45
Ballia	0.00	0.00	12.38	4.14	38.24	12.78	1.52	0.51	0.22	0.07	5.42	1.81	14.94	4.99	7.05	2.35	219.50	73.35
Gorakhpur	5.64	1.67	4.28	1.27	40.98	12.12	4.55	1.35	0.22	0.06	3.44	1.02	6.26	1.85	10.15	3.00	262.49	77.66

Table 1: Districtwise Land Use Pattern in Uttar Pradesh- 1996-2000

(cont...)

Table 1 (contd.)

Maharajganj	47.83	16.32	2.10	0.72	27.93	9.53	1.83	0.62	0.14	0.05	1.73	0.59	3.91	1.33	3.11	1.06	204.50	69.78
Deoria	0.78	0.25	5.60	1.81	36.04	11.63	2.99	0.97	0.11	0.03	4.66	1.50	6.86	2.21	4.42	1.43	248.51	80.17
Kushi Nagar	0.86	0.30	6.02	2.10	45.46	15.88	2.27	0.79	0.14	0.05	2.35	0.82	3.17	1.11	2.34	0.82	223.73	78.13
Basti	3.83	1.14	4.88	1.45	44.03	13.08	6.58	1.95	0.62	0.18	7.26	2.16	8.48	2.52	6.57	1.95	254.35	75.57
Siddharth Nagar	4.00	1.29	2.52	0.82	31.68	10.27	4.81	1.56	0.95	0.31	4.41	1.43	5.75	1.86	5.10	1.65	249.36	80.81
S. K. Nagar	4.36	2.48	3.24	1.84	20.85	11.83	1.66	0.94	0.26	0.15	2.13	1.21	5.03	2.85	2.51	1.42	136.22	77.28
Lucknow	11.41	4.53	10.09	4.01	24.30	9.65	9.33	3.70	3.13	1.24	3.26	1.29	32.54	12.92	17.43	6.92	140.42	55.74
Unnao	16.70	3.67	15.46	3.40	37.66	8.28	14.59	3.21	3.41	0.75	4.62	1.02	33.81	7.43	32.46	7.13	296.28	65.12
Raebareli	4.92	1.08	22.98	5.03	48.48	10.61	19.81	4.33	3.83	0.84	21.09	4.61	24.92	5.45	26.90	5.89	284.15	62.17
Sitapur	5.80	1.01	7.63	1.33	57.33	10.01	8.38	1.46	0.68	0.12	6.30	1.10	47.37	8.27	14.22	2.48	425.05	74.21
Hardoi	8.76	1.46	17.60	2.94	45.77	7.65	22.20	3.71	5.14	0.86	14.26	2.38	39.71	6.63	28.53	4.77	416.69	69.60
Kheri	164.57	21.25	5.95	0.77	73.84	9.53	5.34	0.69	1.00	0.13	6.84	0.88	35.01	4.52	5.31	0.69	476.70	61.55
Faizabad	2.53	0.55	6.11	1.32	62.57	13.57	9.00	1.95	2.64	0.57	13.68	2.97	24.01	5.21	15.49	3.36	325.22	70.51
Ambekar Nagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sultanpur	2.72	0.62	15.19	3.45	48.57	11.04	12.77	2.90	2.80	0.64	7.66	1.74	43.29	9.84	20.98	4.77	285.85	64.99
Barabanki	7.17	1.76	8.56	2.10	49.13	12.06	11.31	2.78	1.78	0.44	9.90	2.43	25.07	6.15	25.41	6.24	269.10	66.05
Gonda	47.73	8.69	6.21	1.13	57.69	10.51	9.79	1.78	1.54	0.28	17.10	3.11	33.84	6.16	14.03	2.56	361.08	65.77
Balrampur	58.37	18.25	3.52	1.10	28.06	8.77	2.66	0.83	0.31	0.10	7.83	2.45	7.37	2.30	5.39	1.68	206.41	64.52
Bahraich	93.36	15.82	6.18	1.05	60.59	10.26	6.38	1.08	0.51	0.09	11.49	1.95	12.32	2.09	8.97	1.52	390.46	66.15
Shravasti	22.90	14.01	1.11	0.68	16.40	10.03	0.99	0.60	0.12	0.08	2.15	1.31	4.58	2.81	0.64	0.39	114.55	70.09
Uttar Pradesh	4499.55	15.69	889.24	3.10	2517.73	8.78	851.84	2.97	251.06	0.88	491.65	1.71	1046.61	3.65	770.47	2.69	17358.17	60.53

Table 1: Districtwise Land Use Pattern in Uttar Pradesh- 1996-2000  
Source: Data obtained from the Directorate of Agriculture, U.P., Lucknow.

Area (in 000 ha.)

Name of District	Forest Lands		Barren Lands		Land Under non Agricultural uses		Cultural waste Lands		Permanent Pasture		Land Under miscellaneous Uses		Current Fallow Lands		Other Fallow Lands		Net Sown Area	
	Area	(%)	Area	(%)	Area	(%)	Area	(%)	Area	(%)	Area	(%)	Area	(%)	Area	(%)	Area	(%)
Saharanpur	33.23	9.24	0.81	0.23	45.17	12.56	1.38	0.38	0.18	0.05	1.37	0.38	2.10	0.58	1.41	0.39	274.06	76.19
Muzaffarnagar	21.42	5.15	5.76	1.38	48.91	11.75	2.75	0.66	0.39	0.09	1.89	0.45	5.67	1.36	3.34	0.80	325.96	78.34
Meerut	24.60	8.95	2.63	0.96	35.68	12.98	3.23	1.18	0.38	0.14	0.90	0.33	4.72	1.72	2.86	1.04	199.80	72.71
Bagpat	1.53	1.13	1.99	1.48	15.33	11.38	1.96	1.45	0.08	0.06	0.12	0.09	1.90	1.41	1.37	1.02	110.47	81.99
Bulandshahar	7.62	2.10	8.05	2.22	37.15	10.27	5.40	1.49	0.85	0.23	3.97	1.10	3.47	0.96	2.43	0.67	292.96	80.95
Ghaziabad	2.90	1.42	4.97	2.44	34.57	16.98	3.32	1.63	0.10	0.05	0.22	0.11	6.36	3.13	4.85	2.38	146.34	71.86
G. B. Nagar	1.20	0.65	5.65	3.04	26.53	14.30	4.28	2.31	0.61	0.33	1.83	0.99	10.24	5.52	7.01	3.78	128.20	69.09
Aligarh	2.66	0.72	9.62	2.60	34.65	9.37	5.65	1.53	1.77	0.48	0.44	0.12	5.39	1.46	8.07	2.18	301.44	81.54
Hatharas	2.09	1.17	4.70	2.63	16.03	8.95	2.18	1.22	1.00	0.56	0.29	0.16	2.52	1.41	3.02	1.69	147.16	82.22
Mathura	1.47	0.45	5.18	1.57	34.99	10.60	5.45	1.65	1.25	0.38	1.05	0.32	5.98	1.81	4.49	1.36	270.16	81.86
Agra	40.93	10.27	5.35	1.34	37.88	9.51	2.40	0.60	0.91	0.23	4.06	1.02	14.85	3.73	6.36	1.60	285.79	71.71
Firozabad	8.61	3.59	7.59	3.16	21.25	8.85	3.58	1.49	0.64	0.27	2.06	0.86	9.14	3.81	7.76	3.23	179.47	74.75
Mainpuri	2.15	0.79	17.67	6.48	19.74	7.24	8.47	3.10	1.39	0.51	2.10	0.77	17.75	6.51	18.52	6.79	184.99	67.81
Etah	3.11	0.71	6.40	1.45	40.01	9.08	28.27	6.41	0.72	0.16	1.51	0.34	17.09	3.88	20.60	4.67	323.13	73.30
Bareilly	0.23	0.06	9.25	2.27	50.62	12.43	1.98	0.49	0.50	0.12	2.54	0.62	9.77	2.40	3.46	0.85	328.78	80.76
Budaun	6.90	1.33	10.53	2.03	43.98	8.46	6.09	1.17	0.38	0.07	6.44	1.24	15.84	3.05	14.73	2.83	415.09	79.83
Shahjahanpur	10.50	2.36	6.85	1.54	39.58	8.88	4.13	0.93	1.01	0.23	4.08	0.91	18.95	4.25	7.86	1.76	352.65	79.14
Pilibhit	80.10	21.67	7.44	2.01	39.06	10.57	3.32	0.90	0.28	0.08	3.39	0.92	2.56	0.69	2.06	0.56	231.35	62.60
Bijnor	48.25	10.39	8.00	1.72	52.12	11.22	3.38	0.73	0.41	0.09	4.53	0.98	4.37	0.94	3.30	0.71	340.21	73.23
Moradabad	0.19	0.05	3.84	1.02	39.16	10.42	1.55	0.41	0.40	0.11	2.41	0.64	8.53	2.27	2.26	0.60	317.60	84.48
J. P. Nagar	15.51	7.15	2.57	1.19	17.49	8.07	1.79	0.82	0.21	0.10	0.86	0.40	5.73	2.64	2.10	0.97	170.58	78.66
Rampur	6.61	2.80	6.28	2.66	26.39	11.20	0.23	0.10	0.01	0.00	0.84	0.35	1.56	0.66	0.53	0.23	193.27	81.99
Farrukhabad	1.05	0.48	8.04	3.66	24.32	11.07	4.68	2.13	0.68	0.31	3.44	1.57	16.38	7.45	6.30	2.87	154.92	70.48
Kannauj	7.97	3.82	9.12	4.36	17.88	8.55	6.58	3.15	2.10	1.01	3.68	1.76	11.08	5.30	7.30	3.50	143.25	68.55
Etawah	35.77	12.55	13.04	4.58	25.16	8.83	7.97	2.80	0.89	0.31	2.28	0.80	18.20	6.39	5.84	2.05	175.85	61.70
Auraiya	3.69	2.29	6.05	3.75	14.12	8.75	4.49	2.79	1.06	0.66	3.34	2.07	11.25	6.97	4.36	2.70	113.01	70.03
Kanpur (urban)	2.38	0.80	20.89	6.98	33.69	11.25	10.78	3.60	3.51	1.17	4.38	1.46	23.41	7.82	9.24	3.09	191.15	63.84
Kanpur (rural)	10.14	3.22	19.14	6.08	22.50	7.14	5.91	1.88	0.44	0.14	2.87	0.91	17.71	5.62	15.62	4.96	220.71	70.06
Fatehpur	5.74	1.36	11.35	2.69	46.54	11.04	10.96	2.60	2.25	0.53	5.84	1.39	31.44	7.46	15.36	3.64	292.02	69.28
Allahabad	19.86	3.59	18.07	3.27	72.54	13.12	13.47	2.44	1.65	0.30	8.51	1.54	45.22	8.18	26.34	4.76	347.42	62.82
Kaushambi	0.96	0.51	8.68	4.62	22.47	11.96	4.53	2.41	0.53	0.28	3.93	2.09	11.68	6.22	5.58	2.97	129.49	68.93
Pratapgarh	0.57	0.16	9.27	2.56	38.87	10.75	7.32	2.02	0.67	0.19	16.24	4.49	55.38	15.32	14.89	4.12	218.32	60.39
Jhansi	33.93	6.79	31.52	6.30	41.34	8.27	15.48	3.10	0.67	0.13	0.89	0.18	31.43	6.29	7.37	1.47	337.40	67.47
Lalitpur	76.16	14.97	16.73	3.29	36.01	7.08	73.33	14.41	3.33	0.65	1.40	0.27	23.11	4.54	20.79	4.09	257.93	50.69
Jalaun	25.64	5.64	12.44	2.74	35.57	7.83	3.01	0.66	0.10	0.02	3.89	0.86	19.73	4.34	6.62	1.46	347.43	76.45
Hamirpur	23.52	5.95	9.17	2.32	30.47	7.71	4.59	1.16	0.38	0.10	0.73	0.18	17.61	4.46	3.69	0.93	304.99	77.18
Mahoba	15.66	4.88	9.24	2.88	33.60	10.46	11.89	3.70	0.43	0.13	0.76	0.24	8.03	2.50	6.42	2.00	235.28	73.23
Banda	5.10	1.15	11.75	2.66	29.48	6.67	11.60	2.63	0.39	0.09	1.29	0.29	19.86	4.50	15.43	3.49	346.84	78.52
Chitrakut	75.85	22.50	22.73	6.74	25.15	7.46	10.84	3.22	0.06	0.02	15.64	4.64	8.13	2.41	6.34	1.88	172.33	51.13
Varanasi	1.70	1.11	3.29	2.16	21.07	13.80	2.63	1.72	0.04	0.02	3.21	2.10	6.83	4.48	3.15	2.06	110.76	72.55
Chandauli	77.40	30.58	3.28	1.29	23.24	9.18	1.68	0.66	0.03	0.01	1.34	0.53	5.92	2.34	3.16	1.25	137.03	54.15
Ghazipur	1.71	0.51	4.03	1.21	43.25	12.98	3.83	1.15	0.84	0.25	3.67	1.10	14.54	4.36	4.35	1.31	256.99	77.12
Jaunpur	0.06	0.02	7.10	1.78	44.88	11.23	7.73	1.94	1.44	0.36	5.03	1.26	30.53	7.64	19.08	4.77	283.86	71.02
Mirzapur	108.64	24.03	9.45	2.09	45.02	9.96	14.93	3.30	0.76	0.17	31.65	7.00	22.86	5.				

Table 2 (contd.)

S. R. Nagar	0.06	0.06	2.75	2.67	16.58	16.09	0.33	0.32	0.38	0.37	0.81	0.79	8.22	7.98	4.61	4.47	69.29	67.24
Azamgarh	0.11	0.03	6.83	1.61	56.42	13.31	6.12	1.44	1.40	0.33	7.32	1.73	34.65	8.17	10.36	2.44	300.81	70.94
Mau	0.56	0.33	2.24	1.31	21.97	12.80	2.24	1.30	0.19	0.11	3.71	2.16	11.29	6.58	3.17	1.85	126.24	73.56
Ballia	0.00	0.00	10.55	3.53	42.79	14.30	1.43	0.48	0.11	0.04	6.00	2.00	14.65	4.89	4.89	1.63	218.85	73.13
Gorakhpur	5.78	1.73	4.27	1.28	42.63	12.72	3.33	0.99	0.22	0.07	2.71	0.81	13.26	3.95	8.32	2.48	254.69	75.98
Maharajganj	45.36	15.61	2.28	0.79	29.85	10.27	1.61	0.56	0.15	0.05	2.03	0.70	4.52	1.55	2.40	0.83	202.47	69.65
Deoria	0.26	0.10	3.02	1.21	29.03	11.66	1.90	0.76	0.12	0.05	3.77	1.51	9.02	3.62	3.20	1.29	198.74	79.79
Kushi Nagar	0.82	0.28	5.34	1.83	48.26	16.55	1.87	0.64	0.27	0.09	4.13	1.42	6.60	2.26	1.86	0.64	222.40	76.28
Basti	4.09	1.48	3.89	1.41	37.32	13.50	4.97	1.80	0.54	0.20	6.90	2.49	6.25	2.26	4.52	1.63	208.09	75.24
Siddharth Nagar	3.62	1.21	2.61	0.88	33.13	11.11	3.07	1.03	0.90	0.30	3.71	1.25	8.23	2.76	2.14	0.72	240.78	80.75
S. K. Nagar	2.65	1.52	2.83	1.62	24.91	14.24	2.21	1.27	0.21	0.12	4.62	2.64	13.42	7.67	3.02	1.73	121.01	69.19
Lucknow	17.25	6.85	8.89	3.53	31.29	12.42	7.41	2.94	3.12	1.24	2.49	0.99	22.15	8.79	20.95	8.32	138.37	54.93
Unnao	16.84	3.70	13.39	2.94	43.15	9.47	14.17	3.11	3.41	0.75	3.94	0.86	32.34	7.10	30.87	6.78	297.47	65.30
Raebareli	5.24	1.15	17.57	3.85	52.38	11.47	18.41	4.03	3.92	0.86	22.86	5.01	34.94	7.65	27.29	5.98	273.97	60.00
Sitapur	5.81	1.01	6.90	1.20	59.26	10.34	7.67	1.34	0.65	0.11	5.94	1.04	40.83	7.13	12.74	2.22	433.12	75.60
Hardoi	10.21	1.70	17.42	2.91	47.52	7.93	18.24	3.05	4.88	0.82	13.01	2.17	39.17	6.54	28.20	4.71	420.27	70.17
Kheri	164.33	21.20	3.49	0.45	75.06	9.68	3.46	0.45	0.94	0.12	6.68	0.86	32.94	4.25	4.85	0.63	483.30	62.36
Faizabad	3.48	1.45	4.03	1.68	32.23	13.43	4.09	1.70	1.87	0.78	7.67	3.20	16.98	7.07	13.00	5.42	156.64	65.27
Ambedkar Nagar	0.33	0.14	3.62	1.53	36.14	15.30	4.43	1.87	0.58	0.25	4.87	2.06	12.85	5.44	7.72	3.27	165.60	70.13
Sultanpur	2.04	0.46	14.83	3.37	49.17	11.18	11.95	2.72	3.64	0.83	7.88	1.79	45.76	10.41	19.97	4.54	284.41	64.69
Barabanki	6.30	1.54	5.57	1.36	53.87	13.17	9.44	2.31	2.05	0.50	9.29	2.27	36.02	8.81	19.62	4.80	266.74	65.23
Gonda	12.93	3.23	4.11	1.03	49.64	12.38	8.14	2.03	1.55	0.39	8.37	2.09	15.49	3.86	7.51	1.87	293.08	73.12
Balrampur	58.94	18.04	3.49	1.07	32.85	10.06	2.38	0.73	0.25	0.08	6.40	1.96	12.64	3.87	2.97	0.91	206.70	63.28
Bahraich	67.72	14.24	3.82	0.80	52.26	10.99	3.91	0.82	0.38	0.08	7.15	1.50	13.89	2.92	6.33	1.33	320.18	67.32
Shrawasti	34.35	17.04	0.69	0.34	22.36	11.09	0.67	0.33	0.13	0.06	1.94	0.96	2.10	1.04	2.09	1.03	137.32	68.10
Uttar Pradesh	1687.98	6.97	573.17	2.37	2549.24	10.53	494.81	2.04	67.82	0.28	347.78	1.44	1134.83	4.69	612.51	2.53	16733.33	69.14

Table 2: Districtwise Land Use Pattern in Uttar Pradesh- 2001-2005

Source: Data obtained from the Directorate of Agriculture, U.P., Lucknow.

### 1.1.8. Others Fallow Lands

This category of land include lands which are taken for cultivation but remain out of cultivation for a period of not less than a year and not more than five years for some reasons. Area under other fallow lands show a slight decrease from 770.47 thousand ha. (2.69 percent) during 1996-2000 to 612.51 thousand ha. (2.53 percent) during 2001-05 in the state. Area under this category of land use show a declining trend in almost all the districts of the state except the districts of Kanpur (rural), Allahabad, Jaunpur, S. R. Nagar, S. K. Nagar, Lucknow, Faizabad and Shrawasti which show a increasing trend under this category.

### 1.1.9. Net Sown Area

Cropped area in the year under consideration is called net sown area. This area has a special significance in agriculture because agricultural production largely depends upon this type of land. Net sown area shows an increasing trend during 1996-2000, which was 60.53 percent but during 2001-2005, it increased to 69.14 percent. Net sown area shows variations in each district of the state. Its concentration is found in almost all the districts of the state but an increasing trend under it is shown mainly in the districts of Saharanpur, Bulandshahar, Ghaziabad, Aligarh, Hathras, Mathura, Firozabad, Etah, Budaun, Pilibhit, Bijnor, Moradabad, Farrukhabad, Auraiya, Kanpur (urban), Kanpur (rural), Fatehpur, Kaushambi, Lalitpur Jalaun, Haminpur, Mahoba, Banda, Chitrakut, Varanasi, Sitapur, Hardoi, Kheri, Ambedkar Nagar, Gonda and Bahraich but decreasing trend found mostly in the districts of Meerut, G. B. Nagar, J. P. Nagar, Allahabad, Jhansi, Azamgarh, Gorakhpur, Kushi Nagar, S. K. Nagar, Raebareli, Faizabad, Balrampur and Shrawasti.

### 1.2. Cropping Patterns

Cropping pattern refers to the proportion of area under devoted to crops at any given point of time in an unit area or the sequence and spatial arrangement of crops follow on a given area. Before dealing with the cropping pattern, it would be worthwhile to preface this study with some basic explanations related to crops, their sowing and harvesting seasons.

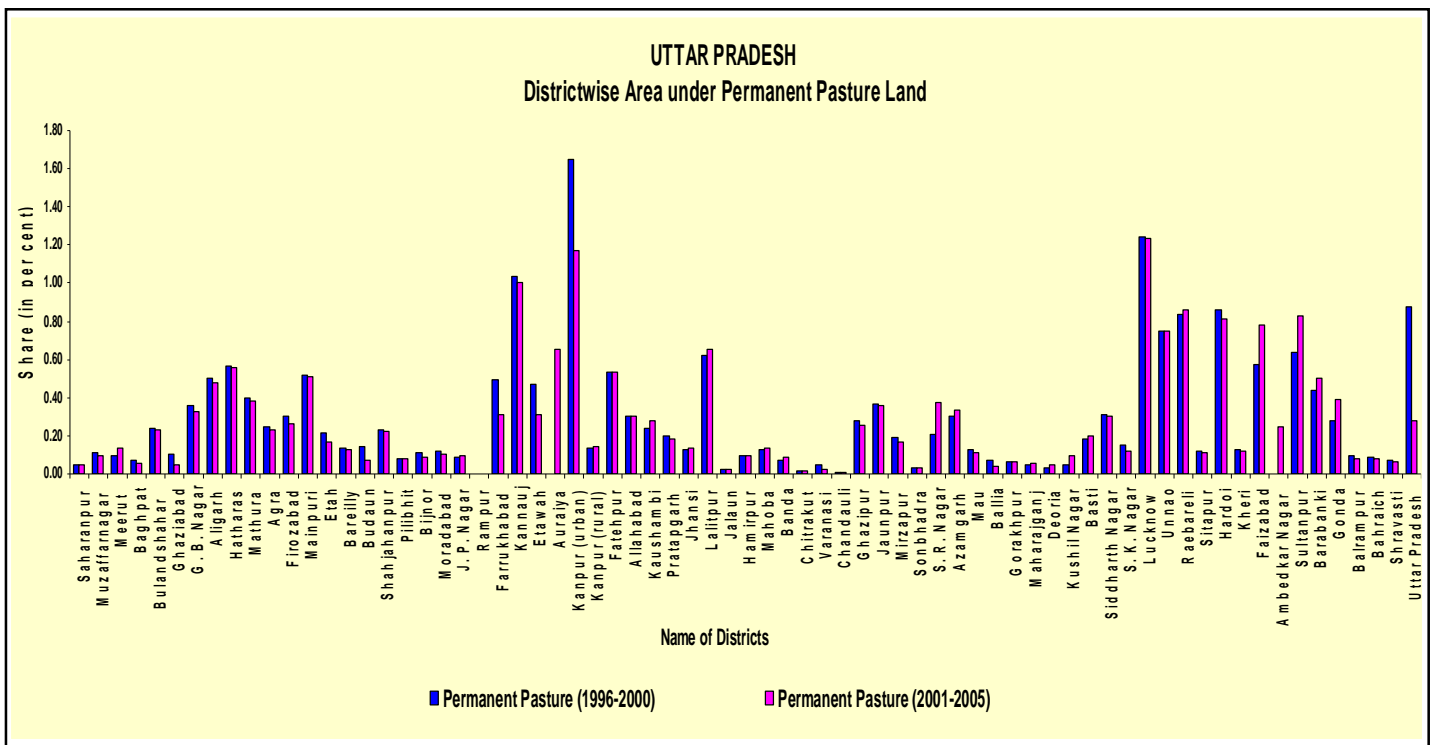


Figure 5  
Source: Prepared by the Author.

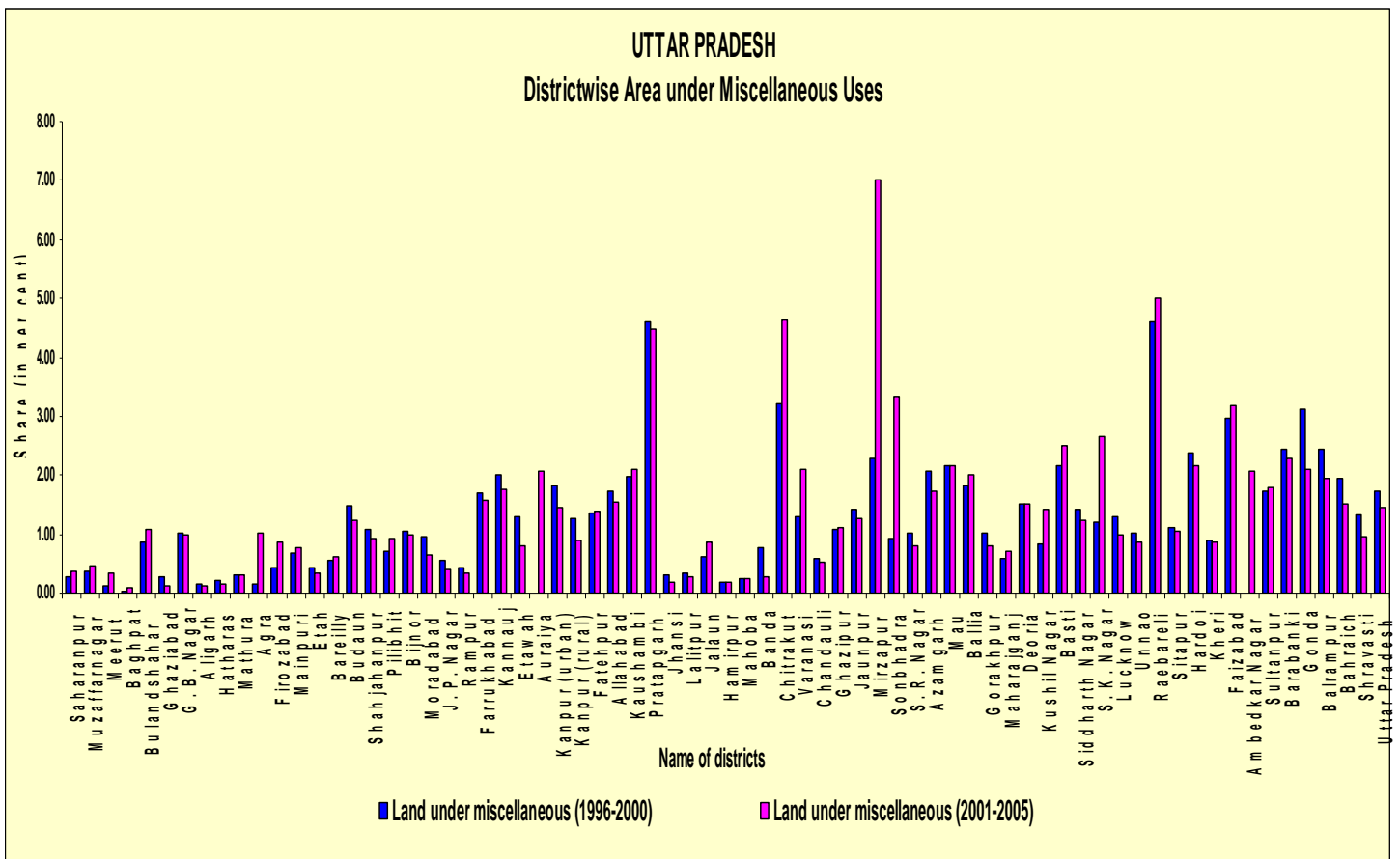


Figure 6  
Source: Prepared by the Author.



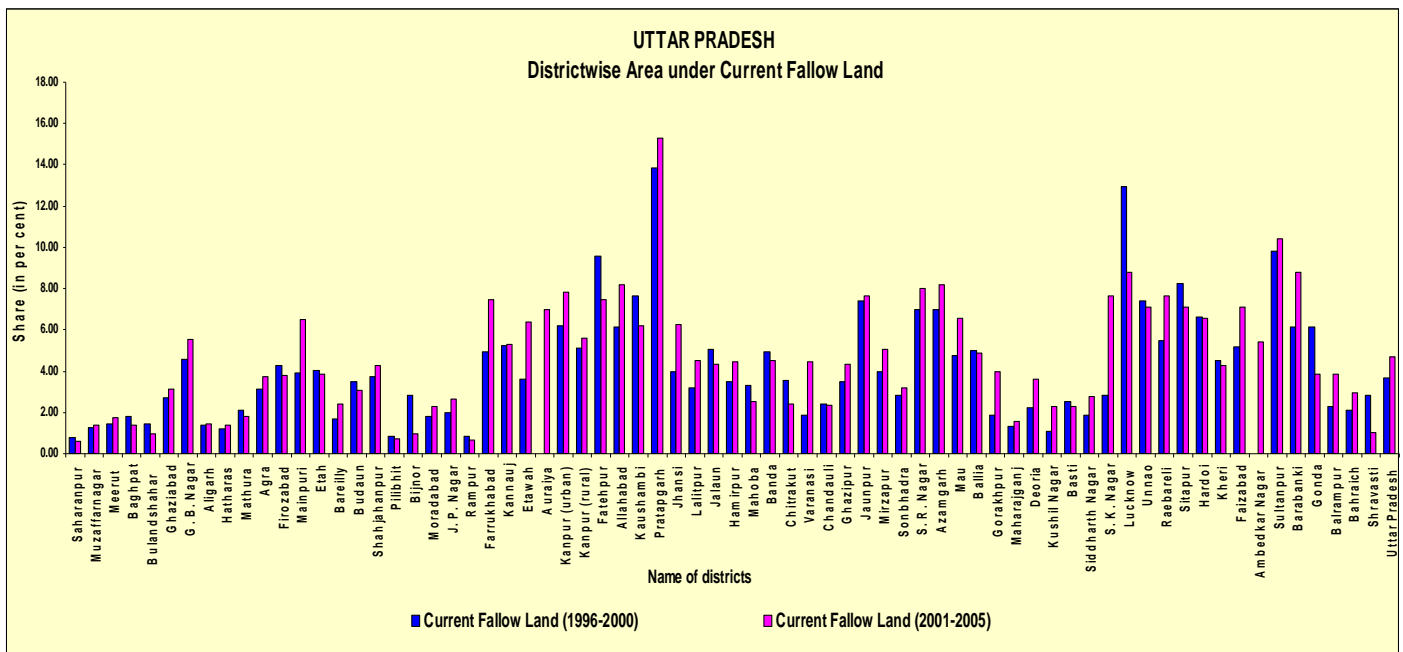


Figure 7  
Source: Prepared by the Author.

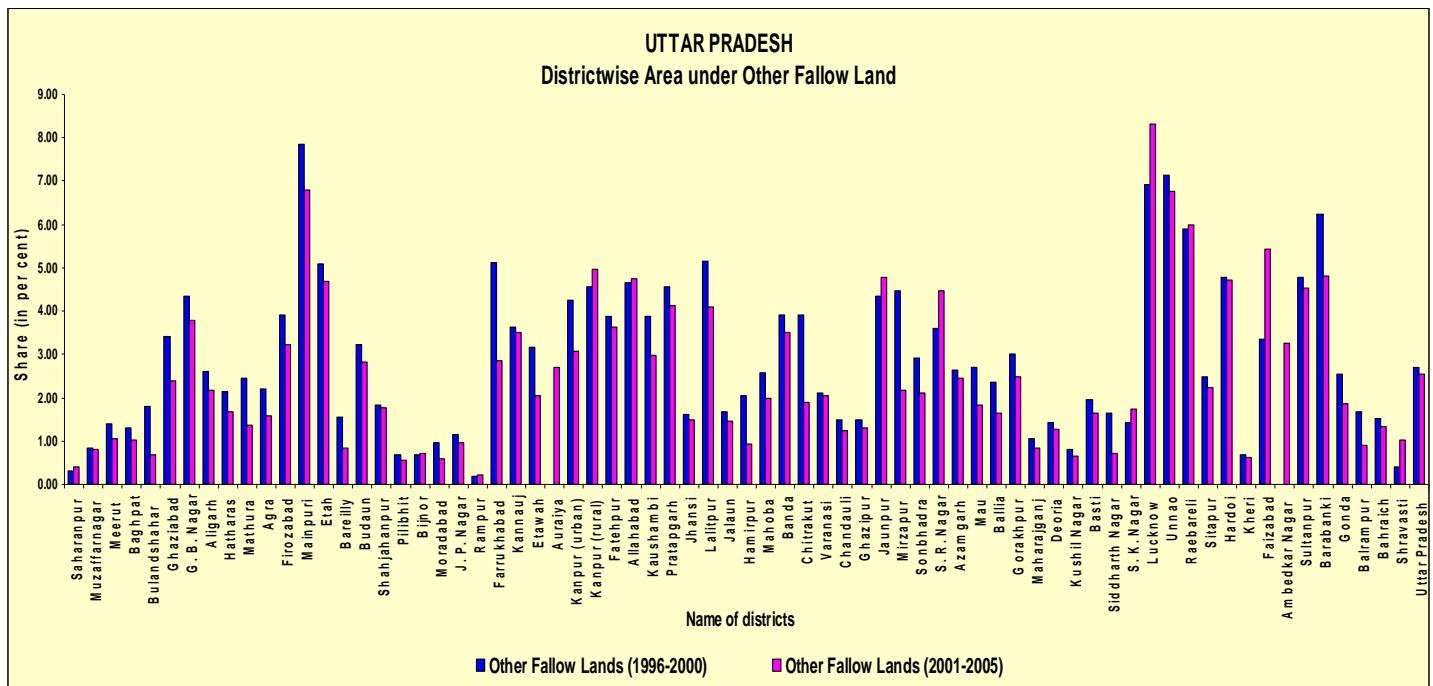


Figure 8  
Source: Prepared by the Author.

There are two main crop seasons in which crops are grown in the state, e.g., *kharif* or the summer crop season, and the *rabi* or the winter crop season. Therefore, sowing in *kharif* season begins generally with the onset of southwest monsoon in mid-June, while the *rabi* season sowing starts with the beginning of cold weather season, i.e., by the end of the month of October or early November, when the monsoon has receded. The food crops grown in *kharif* season are: rice (*Oryza sativa*), jowar (*Sorghum vulgare*), bajara (*Pennisetum typhoidieum*), maize (*Zea mays*), pizeon-pea (*Cajanus indicus*), green gram, (*Phaseolus aureus roxb*), black gram (*Phaseolus mungo*), groundnut (*Arachis hypogea*) and sugarcane (*Saccharum officinarum*). These crops require high temperatures and plentiful supply of water. The food crops of *rabi* season are: wheat (*Triticum sativum*), lentils (*Lens esculenta*, also Erven lens) barley (*Hordeum vulgare*), Bengal gram (*Cicer arientinum*), peas (*Pisum sativum*) and potatoes (*Solanum tuberosum*). These crops require cool weather and moderate supply of water. The harvesting period of *kharif* crops starts at the end of monsoon, i.e., September to October (may continue till November in some cases), and the *rabi* crops are generally harvested.

For ascertaining the changes in crop land use pattern, 18 major crops grown in the state were considered i.e., Cereal crops to include rice, maize, jowar, *bajra*, wheat and barley, Pulse crops to include *urad*, *moong*, *arhar*, pea, gram and *masoor*, Oilseed crops to include groundnut, soybean, *til* and mustard and Cash Crops to include potato and sugarcane. An average of 5 years taken for the period of 1996-2000 and 2001-2005 for 70 districts of the state were considered. (Table. 1.4 and 1.5)

**1.2.1. Cereal Crops**

Cereal crops are the most important crops covered 17,559 thousand ha. area (73.76 percent) of the total cropped area which grown almost in all the 70 districts of the state, but these crops covered more area as compare to the pulses, oilseeds and cash crops. During 1996-2000, there were 33 districts have area under cereal crops above 80 percent, these districts are G. B. Nagar, Chandauli, Siddharth Nagar, Gorakhpur, S. K. Nagar, Mau, Azamgarh, S. R. Nagar, Deoria, Pratapgarh, Rampur, Jaunpur, Maharajganj, Ambedkar Nagar, Mainpuri, Unnao, Budaun, Varanasi, Ghazipur, Ballia, Allahabad, Basti, Faizabad, Raebareli, Sultanpur, Lucknow,

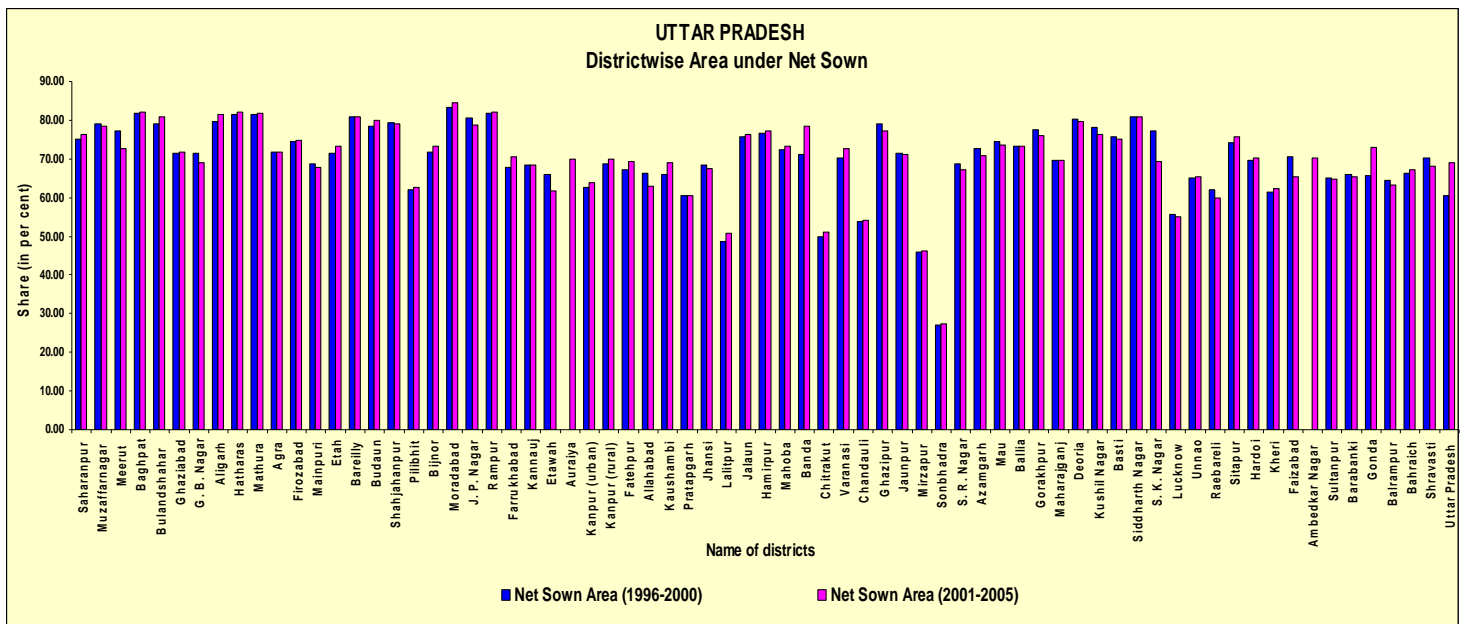


Figure 9  
Source: Prepared by the Author.

Shravasti, Pilibhit, Mirzapur, Gonda, Etah, Auraiya and Bulandshahr. Cereal crops show area in between 60 and 80 percent in 27 districts of namely, Aligarh, Barabanki, Bahraich, Etawah, Sonbhadra, Hardoi, Shahjahanpur, Firozabad, Kaushambi, Moradabad, Mathura, Bareilly, Hatharas, Kannauj, Fatehpur, Balrampur, Farrukhabad, Kanpur (urban), Kushi Nagar, Sitapur, Kanpur (rural), J. P. Nagar, Agra, Ghaziabad, Chitrakut, Saharanpur and Banda. There were 6 districts of Kheri, Baghpat, Bijnor, Lalitpur, Meerut and Muzaffarnagar have area in between 40-60 percent and 4 districts of Hamirpur, Jalaun, Jhansi and Mahoba have less area in between 20 and 40 percent.

During 2001-2005, the area under cereal crops covered 17352.35 thousand ha. (74.40 percent) of total cropped area in the state. With the increasing population in the state, the demands of cereal crops are also increasing. The area under cereal crops have increased from 73.76 percent during 1996-2000 to 74.40 percent during 2001-2005. Area under cereal crops show high percentage above 80 in 38 districts of namely, G. B. Nagar, Gorakhpur, Siddharth Nagar, Mau, S. K. Nagar, Chandauli, Deoria, Rampur, Azamgarh, S.R. Nagar, Mainpuri, Ambedkar Nagar, Etah, Maharajganj, Jaunpur, Ghazipur, Allahabad, Pratapgarh, Aligarh, Unnao, Varanasi, Ballia, Budaun, Lucknow, Sultanpur, Raebareli, Mathura, Auraiya, Pilibhit, Shahjahanpur, Firozabad, Hardoi, Etawah, Shravasti, Faizabad, Mirzapur, Bahraich, Basti. Area in between 60-80 percent lie in districts of namely, Hatharas, Gonda, Bulandshahr, Barabanki, Kaushambi, Moradabad, Sonbhadra, Bareilly, Kanpur (rural), Kushi Nagar, Kannauj, Kanpur (urban), Farrukhabad, Fatehpur, Agra, Balrampur, Sitapur, J. P. Nagar. Cereals have area in between 40-60 percent, found in districts of Ghaziabad, Kheri, Banda, Saharanpur, Chitrakut, Baghpat, Bijnor, Meerut, Muzaffarnagar and Jalaun. Cereal crops show less area in between 20 and 40 percent in Lalitpur, Hamirpur, Jhansi and Mahoba.

**1.2.2. Pulse Crops**

Next to cereal crops, pulse crops are most important crops covered 2790.75 thousand ha. (11.72 percent) of total cropped area in the state (during 1996-2000). Pulse crops show area above 40 percent in 5 districts of namely, Hamirpur, Mahoba, Jalaun, Jhansi and Lalitpur and 2 districts of Banda and Chitrakut have area in between 30 and 40 percent. Fatehpur is the single districts show area in between 20-30 percent. There were 20 districts having area in between 10 and 20 percent, these districts are Kanpur (rural), Balrampur, Kaushambi, Sonbhadra, Kanpur (urban), Bahraich, Mirzapur, Shravasti, Allahabad, Gonda, Raebareli, Lucknow, Sultanpur, Etawah, Ballia, Pratapgarh, Etah, Sitapur, Ghazipur and Barabanki.

Area (in 000 ha.)				
Crops	1996-2000	%	2001-2005	%
Cereals	17559.00	73.76	17352.35	74.4
Pulses	2790.75	11.72	2726.33	11.69
Oilseeds	1028.98	4.32	776.00	3.33
Cash Crops	2428.34	10.2	2466.97	10.58

Table 3: Cropwise Area in Uttar Pradesh

Source: Data obtained from the Directorate of Agriculture, U.P., Lucknow.

Pulse crops show less area below 10 percent in 42 districts of namely, Varanasi, S. R. Nagar, Auraiya, Aligarh, Hardoi, Hatharas, Faizabad, Unnao, Jaunpur, Basti, Chandauli, Siddharth Nagar, Mainpuri, Gorakhpur, Kannauj, S. K. Nagar, Ambedkar Nagar, Maharajganj, Azamgarh, Kheri, Farrukhabad, Firozabad, Agra, Bulandshahar, Deoria, Shahjahanpur, Mau, Bareilly, Budaun, G. B. Nagar, Mathura, Saharanpur, Kushi Nagar, Pilibhit, Ghaziabad, Rampur, Muzaffarnagar, Bijnor, Meerut, Baghpat, Moradabad and J. P. Nagar.

During 2001-2005, the state have covered 2726.33 thousand ha. (11.69 percent) of total cropped area under pulse crops. Pulse crops have area above 40 percent in 7 districts of namely, Mahoba, Hamirpur, Jhansi, Lalitpur, Jalaun, Banda and Chitrakut. Only one district of Fatehpur has area in between 30-40 percent. There were 14 districts have area in between 10 and 20, these districts are Sonbhadra, Kanpur (rural), Kaushambi, Kanpur (urban), Mirzapur, Shravasti, Balrampur, Bahraich, Barabanki, Sultanpur, Raebareli, Allahabad, Pratapgarh and Lucknow and rest of 48 districts of namely, Ballia, Sitapur, Chandauli, Ghazipur, Varanasi, Auraiya, Unnao, Gonda, S. R. Nagar, Etawah, Jaunpur, Faizabad, Hardoi, Basti, Budaun, Aligarh, Hatharas, Ambedkar Nagar, S. K. Nagar, Kannauj, Azamgarh, Siddharth Nagar, Bulandshahar, Etah, Maharajganj, Kheri, Gorakhpur, Farrukhabad, Deoria, Bareilly, Agra, Mau, Moradabad, Shahjahanpur, Mainpuri, G. B. Nagar, Firozabad,

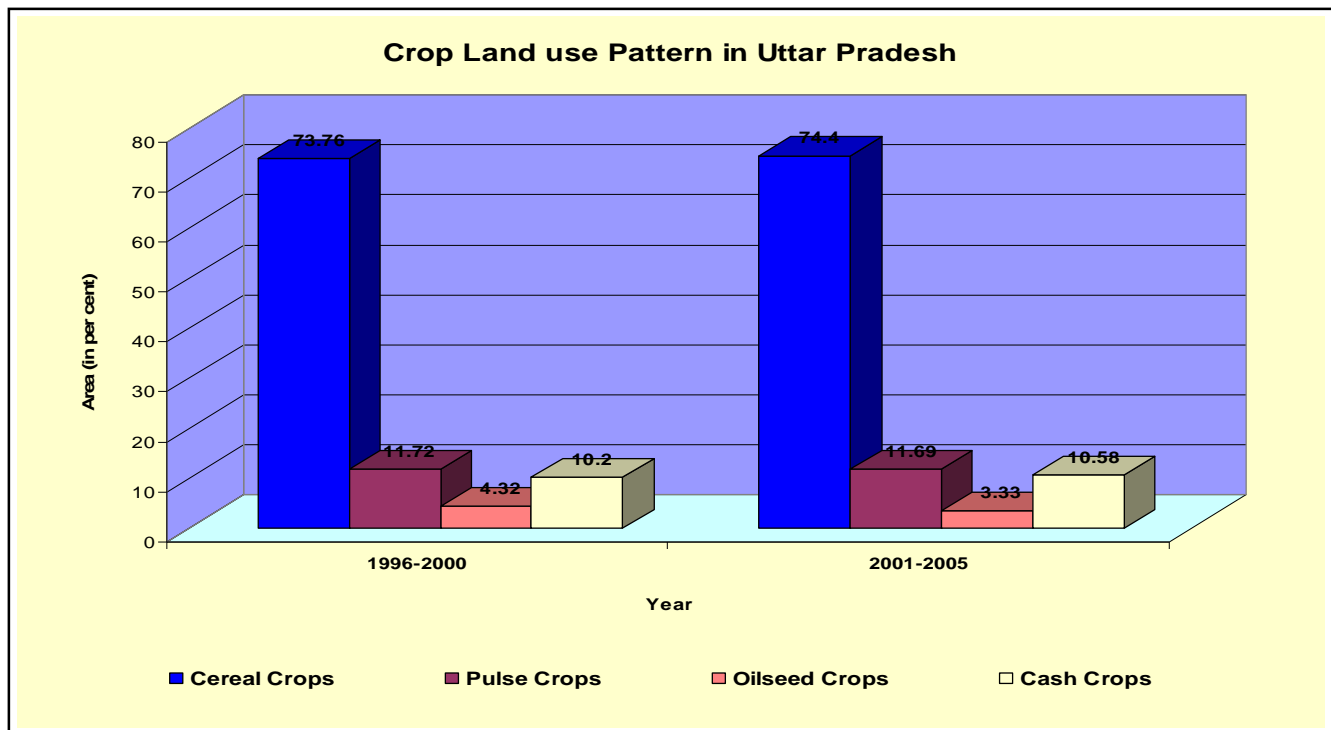


Figure 10

Source: Prepared by the Author.

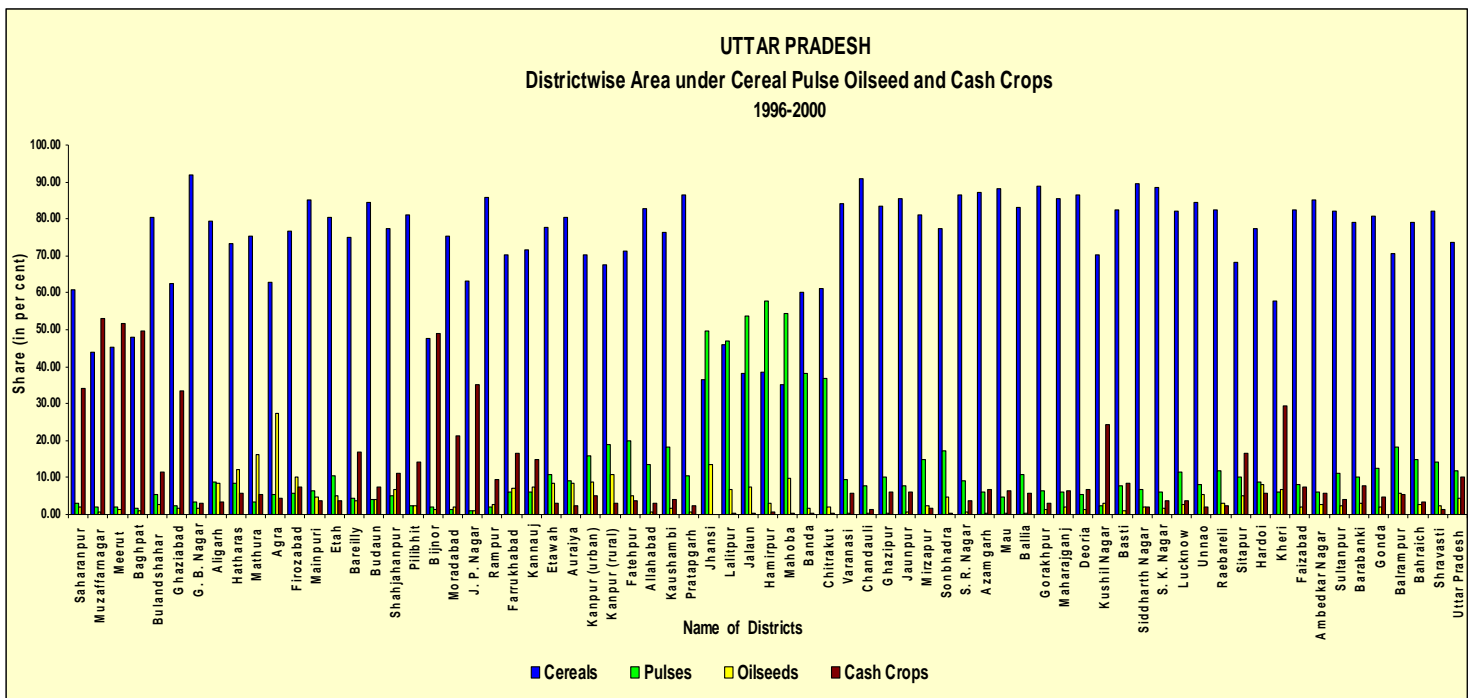


Figure 11  
Source: Prepared by the Author.

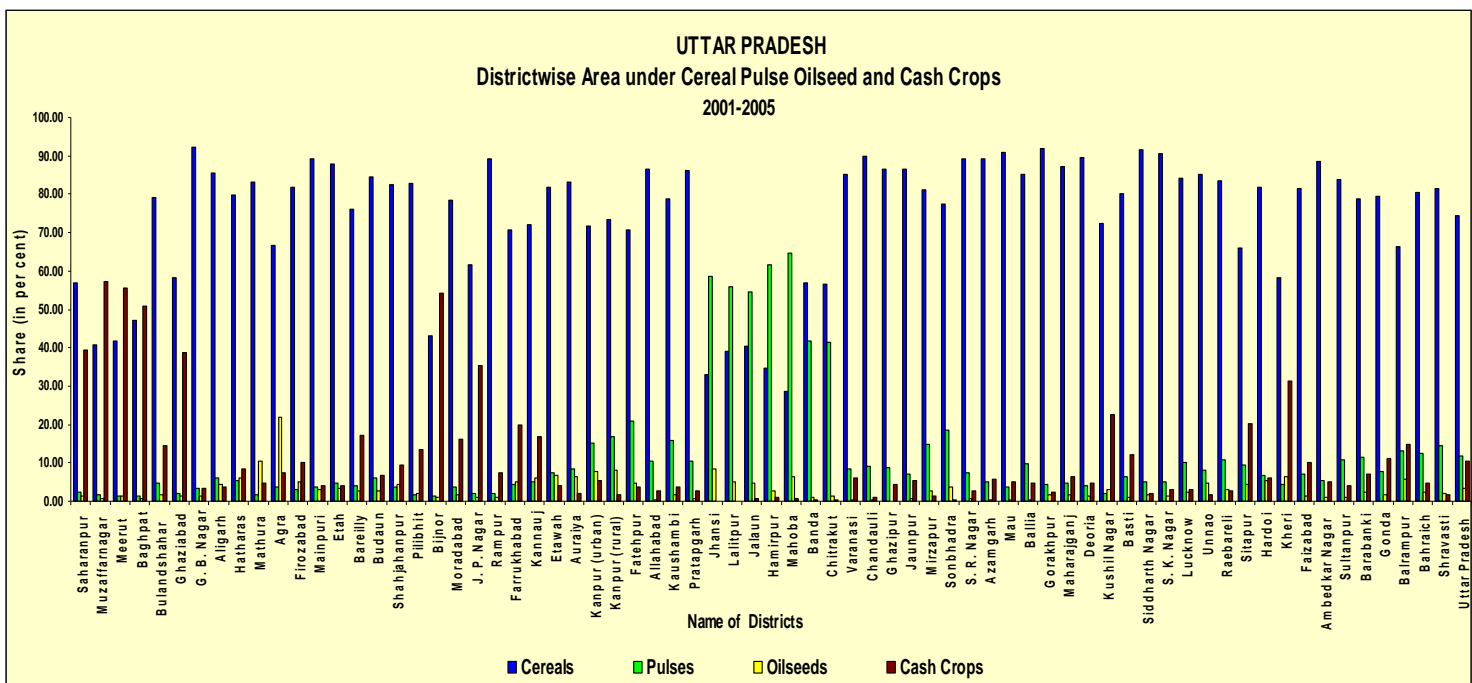


Figure 12: Saharanpur, Rampur, J. P. Nagar, Kushi Nagar, Ghaziabad, Pilibhit, Mathura, Muzaffarnagar, Bijnor, Meerut and Baghpat have area below 10 percent.  
Source: Prepared by the Author.

1.2.3. Oilseed Crops

During 1996-2000, oilseed crops covered 1028.98 thousand ha. (4.32 percent) of total cropped area which is less as compare to the cereal, pulse and cash crops. There were only two districts of Agra and Mathura have area above 16 percent and two districts of Jhansi and Hatharas have area in between 12 and 16. Oilseeds show area in between 8 and 12 percent in 8 districts of Kanpur (rural), Firozabad, Mahoba, Kanpur (urban), Etawah, Aligarh, Auraiya and Hardoi. There were 14 districts have area under oilseeds in between 4 and 8 percent, these districts are Jalaun, Kannauj, Farrukhabad, Kheri, Lalitpur, Shahjahanpur, Balrampur, Unnao, Etah, Fatehpur, Sitapur, Sonbhadra, Mainpuri and Budaun and rest of districts namely, Bareilly, Raebareli, Hamirpur, Kushi Nagar, Barabanki, Ambedkar Nagar, Bahraich, Bulandshahar, Rampur, Lucknow, Pilibhit, Sultanpur, Shravasti, Mirzapur, Faizabad, Gonda,

Saharanpur, Maharajganj, Moradabad, Siddharth Nagar, Chitrakut, G. B. Nagar, S. K. Nagar, Ghaziabad, Banda, Kaushambi, Gorakhpur, Bijnor, Deoria, Meerut, Basti, Baghpat, J. P. Nagar, Pratapgarh, S. R. Nagar, Muzaffarnagar, Allahabad, Jaunpur, Varanasi, Mau, Ballia, Chandauli, Azamgarh and Ghazipur have area below 4 percent.

During 2001-2005, Oilseed crops show decrease in area which has covered 776.00 thousand ha. (3.33 percent) of the total cropped area. There were only one districts of Agra show area above 16 percent, and the districts of Mathura has area in between 12-16. There were 2 districts of Jhansi and Kanpur (rural) have area in between 8-12 percent. There were 18 districts have area under oilseeds in between 4-8 percent These districts are Kanpur (urban), Etawah, Auraiya, Mahoba, Kheri, Kannauj, Hatharas, Balrampur, Hardoi, Lalitpur, Farrukhabad, Firozabad, Unnao, Fatehpur, Jalaun, Aligarh, Sitapur and Shahjahanpur and rest of districts namely, Sonbhadra, Etah, Mainpuri, Kushi Nagar, Raebareli, Budaun, Hamirpur, Bareilly, Mirzapur, Barabanki, Lucknow, Bahraich, Shravasti, Pilibhit, Bulandshahar, Siddharth Nagar, Moradabad, Maharajganj, Gonda, Gorakhpur, Kaushambi, S. K. Nagar, Saharanpur, Chitrakut, Deoria, Faizabad, Meerut, Ghaziabad, G. B. Nagar, Rampur, Ambedkar Nagar, Bijnor, Basti, Sultanpur, J. P. Nagar, Banda, Baghpat,

**AREA (in 000 ha.)**

Name of District	Area under Cereals	%	Area under Pulses	%	Area under Oilseeds	%	Area under Cash Crops	%
Saharanpur	207.48	60.85	10.28	3.02	6.96	2.04	116.25	34.09
Muzaffarnagar	176.03	44.07	8.28	2.07	2.73	0.68	212.41	53.17
Meerut	132.16	45.13	5.45	1.86	3.47	1.19	151.73	51.82
Bagpat	62.19	47.96	2.03	1.57	1.17	0.90	64.27	49.57
Bulandshahar	343.39	80.39	23.27	5.45	11.52	2.70	48.96	11.46
Ghaziabad	116.95	62.50	4.21	2.25	3.07	1.64	62.90	33.61
G.B. Nagar	117.72	91.87	4.40	3.43	2.29	1.78	3.73	2.91
Aligarh	397.48	79.43	44.77	8.95	41.82	8.36	16.36	3.27
Hatharas	146.81	73.40	17.18	8.59	24.62	12.31	11.40	5.70
Mathura	270.03	75.27	11.58	3.23	57.96	16.16	19.16	5.34
Agra	227.94	62.74	20.16	5.55	98.82	27.20	16.38	4.51
Firozabad	186.57	76.78	13.66	5.62	24.85	10.23	17.91	7.37
Mainpuri	245.42	85.01	18.97	6.57	13.42	4.65	10.87	3.77
Etah	379.53	80.47	49.44	10.48	24.35	5.16	18.31	3.88
Bareilly	352.74	75.11	20.07	4.27	17.54	3.74	79.30	16.88
Budaun	493.97	84.31	23.30	3.98	24.17	4.13	44.45	7.59
Shahjahanpur	418.55	77.34	27.53	5.09	35.68	6.59	59.43	10.98
Pilibhit	281.70	81.08	7.97	2.29	8.72	2.51	49.06	14.12
Bijnor	196.84	47.54	8.32	2.01	5.40	1.30	203.53	49.15
Moradabad	380.05	75.37	7.28	1.44	9.59	1.90	107.35	21.29
J.P. Nagar	143.99	63.03	2.14	0.94	2.03	0.89	80.30	35.15
Rampur	277.77	85.94	6.93	2.14	8.33	2.58	30.16	9.33
Farrukhabad	205.30	70.32	17.26	5.91	20.88	7.15	48.49	16.61
Kannauj	153.79	71.77	13.35	6.23	15.60	7.28	31.53	14.71
Etawah	238.44	77.70	33.27	10.84	25.87	8.43	9.31	3.03
Auraiya	172.81	80.46	19.24	8.96	17.89	8.33	4.82	2.25
Kanpur (urban)	135.07	70.17	30.76	15.98	17.09	8.88	9.57	4.97
Kanpur (rural)	241.86	67.41	67.99	18.95	38.34	10.69	10.62	2.96
Fatehpur	274.03	71.13	77.28	20.06	19.46	5.05	14.47	3.75
Allahabad	460.55	82.65	75.41	13.53	3.70	0.66	17.60	3.16
Kaushambi	126.50	76.38	29.94	18.08	2.53	1.53	6.64	4.01
Pratapgarh	327.48	86.34	40.12	10.58	2.60	0.69	9.11	2.40
Jhansi	141.42	36.63	191.52	49.61	52.72	13.65	0.42	0.11
Lalitpur	143.66	46.01	146.87	47.03	21.06	6.75	0.68	0.22
Jalaun	143.51	38.20	202.42	53.88	27.85	7.41	1.88	0.50
Hamirpur	143.55	38.40	215.37	57.61	11.77	3.15	3.16	0.84
Mahoba	69.22	35.25	107.13	54.55	19.15	9.75	0.89	0.45
Banda	291.48	60.04	185.34	38.18	7.60	1.57	1.06	0.22
Chitrakut	107.05	60.99	64.60	36.80	3.27	1.86	0.61	0.35
Varanasi	205.74	84.25	23.29	9.54	1.03	0.42	14.14	5.79
Chandauli	198.75	90.93	16.62	7.60	0.53	0.24	2.69	1.23
Ghazipur	311.52	83.46	38.10	10.21	0.87	0.23	22.80	6.11
Jaunpur	357.86	85.52	32.86	7.85	2.41	0.58	25.34	6.05
Mirzapur	234.87	81.07	42.85	14.79	6.74	2.33	5.25	1.81
Sonbhadra	175.57	77.50	39.23	17.32	10.66	4.71	1.07	0.47
S.R.Nagar	84.34	86.57	8.95	9.18	0.67	0.69	3.47	3.56
Azamgarh	420.86	87.03	28.96	5.99	1.18	0.24	32.55	6.73
Mau	183.30	88.33	9.85	4.75	0.82	0.39	13.55	6.53
Ballia	274.77	83.19	35.27	10.68	1.00	0.30	19.24	5.82
Gorakhpur	335.27	88.97	24.09	6.39	5.46	1.45	11.99	3.18

Table 4: Districtwise Area under Cereals, Pulses, Oilseeds and Cash Crops in Uttar Pradesh-1996 - 2000

(cont..)

Table 4 (contd.)

Maharajganj	297.19	85.50	21.04	6.05	6.84	1.97	22.54	6.48
Deoria	264.17	86.45	16.53	5.41	3.75	1.23	21.12	6.91
Kushii Nagar	219.80	70.13	7.39	2.36	9.87	3.15	76.38	24.37
Basti	298.29	82.59	28.29	7.83	4.10	1.13	30.49	8.44
Siddharth Nagar	304.42	89.36	23.24	6.82	6.46	1.90	6.55	1.92
S.K.Nagar	165.45	88.42	11.51	6.15	3.11	1.66	7.05	3.77
Lucknow	148.55	82.18	20.75	11.48	4.67	2.58	6.80	3.76
Unnao	350.17	84.39	33.06	7.97	22.88	5.51	8.85	2.13
Raebareli	333.90	82.42	48.34	11.93	12.78	3.16	10.10	2.49
Sitapur	380.86	68.22	57.12	10.23	27.64	4.95	92.68	16.60
Hardoi	465.65	77.44	52.60	8.75	49.02	8.15	34.07	5.67
Kheri	363.23	57.89	37.44	5.97	42.72	6.81	184.06	29.34
Faizabad	233.55	82.57	22.89	8.09	5.85	2.07	20.56	7.27
Ambedkar Nagar	179.55	85.15	12.93	6.13	5.96	2.83	12.43	5.90
Sultanpur	339.03	82.26	46.36	11.25	9.93	2.41	16.82	4.08
Barabanki	311.82	78.95	40.21	10.18	11.90	3.01	31.03	7.86
Gonda	419.98	80.69	64.88	12.46	10.80	2.07	24.86	4.78
Balrampur	187.50	70.58	48.41	18.22	15.38	5.79	14.37	5.41
Bahraich	410.85	78.92	77.24	14.84	14.65	2.81	17.88	3.43
Shravasti	196.37	82.06	33.89	14.16	5.71	2.39	3.34	1.40
Uttar Pradesh	17559.00	73.76	2790.75	11.72	1028.98	4.32	2428.34	10.20

Table 4: Districtwise Area under Cereals, Pulses, Oilseeds and Cash Crops in Uttar Pradesh-1996 - 2000

Source: Data obtained from the Directorate of Agriculture, U.P., Lucknow.

Name of District	AREA (in 000 ha.)							
	Area under Cereals	%	Area under Pulses	%	Area under Oilseeds	%	Area under Cash Crops	%
Saharanpur	189.23	56.86	7.74	2.33	4.80	1.44	131.01	39.37
Muzaffarnagar	160.46	40.69	6.06	1.54	2.62	0.66	225.20	57.11
Meerut	100.07	41.91	3.52	1.47	2.89	1.21	132.32	55.41
Bagpat	63.04	47.11	1.78	1.33	1.05	0.79	67.93	50.77
Bulandshahar	315.57	78.98	19.08	4.78	7.38	1.85	57.54	14.40
Ghaziabad	102.77	58.29	3.36	1.90	2.12	1.20	68.04	38.60
G.B. Nagar	106.32	92.22	3.74	3.24	1.36	1.18	3.88	3.36
Aligarh	383.49	85.68	26.79	5.99	20.12	4.49	17.18	3.84
Hatharas	163.13	79.85	11.16	5.46	12.63	6.18	17.37	8.50
Mathura	294.70	83.27	5.66	1.60	37.26	10.53	16.31	4.61
Agra	246.79	66.75	14.22	3.85	81.00	21.91	27.69	7.49
Firozabad	207.82	81.88	7.65	3.01	12.68	5.00	25.65	10.11
Mainpuri	246.57	89.08	10.02	3.62	8.79	3.17	11.43	4.13
Etah	398.27	87.88	21.31	4.70	15.41	3.40	18.19	4.01
Bareilly	368.56	76.05	20.12	4.15	13.24	2.73	82.71	17.07
Budaun	528.04	84.44	38.22	6.11	17.42	2.79	41.66	6.66
Shahjahanpur	454.34	82.51	19.94	3.62	24.20	4.40	52.17	9.47
Pilibhit	307.35	82.92	6.02	1.62	7.75	2.09	49.54	13.37
Bijnor	171.55	43.10	5.96	1.50	4.25	1.07	216.25	54.33
Moradabad	369.28	78.39	17.35	3.68	8.24	1.75	76.20	16.18
J.P. Nagar	129.23	61.57	4.20	2.00	2.04	0.97	74.43	35.46
Rampur	280.11	89.35	6.44	2.06	3.59	1.15	23.36	7.45
Farrukhabad	135.56	70.86	8.29	4.33	9.60	5.02	37.87	19.79

Table 5: Districtwise Area under Cereals, Pulses, Oilseeds and Cash Crops in Uttar Pradesh-2001-2005

(cont..)

Kannauj	150.21	71.95	10.27	4.92	12.94	6.20	35.35	16.93
Etawah	180.97	81.81	16.44	7.43	14.99	6.78	8.82	3.99
Auraiya	179.78	83.14	17.93	8.29	14.16	6.55	4.37	2.02
Kanpur (urban)	180.42	71.62	38.42	15.25	19.29	7.66	13.76	5.46
Kanpur (rural)	216.29	73.27	49.51	16.77	24.32	8.24	5.09	1.72
Fatehpur	273.68	70.55	80.95	20.87	18.45	4.76	14.83	3.82
Allahabad	439.27	86.48	53.76	10.58	1.98	0.39	12.92	2.54
Kaushambi	131.01	78.80	26.40	15.88	2.68	1.61	6.17	3.71
Pratapgarh	273.85	86.25	33.24	10.47	2.30	0.73	8.11	2.55
Jhansi	135.81	32.88	241.43	58.45	35.41	8.57	0.39	0.09
Lalitpur	137.08	39.00	196.29	55.84	17.66	5.02	0.49	0.14
Jalaun	157.61	40.32	213.28	54.56	17.97	4.60	2.05	0.53
Hamirpur	116.08	34.76	205.31	61.49	9.29	2.78	3.22	0.96
Mahoba	74.47	28.45	169.10	64.61	16.82	6.43	1.34	0.51
Banda	236.22	57.01	173.58	41.89	3.75	0.91	0.79	0.19
Chitrakut	105.70	56.71	77.27	41.46	2.68	1.44	0.72	0.39
Varanasi	128.25	85.08	12.77	8.47	0.66	0.44	9.07	6.02
Chandauli	207.06	90.00	20.54	8.93	0.40	0.17	2.06	0.89
Ghazipur	335.82	86.50	34.45	8.87	0.63	0.16	17.32	4.46
Jaunpur	373.35	86.56	31.21	7.24	2.83	0.66	23.93	5.55
Mirzapur	231.66	81.15	42.33	14.83	7.24	2.54	4.23	1.48
Sonbhadra	178.54	77.28	42.75	18.51	8.59	3.72	1.15	0.50
S.R.Nagar	85.87	89.26	7.25	7.54	0.59	0.61	2.49	2.59
Azamgarh	434.40	89.31	23.91	4.92	1.02	0.21	27.03	5.56
Mau	185.67	90.85	7.63	3.74	0.82	0.40	10.25	5.02
Ballia	289.91	85.08	33.71	9.89	1.45	0.43	15.67	4.60
Gorakhpur	343.08	91.79	16.22	4.34	6.20	1.66	8.25	2.21
Maharajganj	307.83	87.32	16.47	4.67	5.94	1.69	22.27	6.32
Deoria	280.28	89.66	12.99	4.16	4.25	1.36	15.07	4.82
Kushi Nagar	236.42	72.55	6.25	1.92	9.91	3.04	73.29	22.49
Basti	234.68	80.20	19.03	6.50	3.03	1.03	35.89	12.26
Siddharth Nagar	306.85	91.42	16.40	4.89	6.07	1.81	6.31	1.88
S.K.Nagar	179.66	90.56	9.83	4.95	2.97	1.50	5.93	2.99
Lucknow	146.52	84.31	17.70	10.19	4.14	2.38	5.42	3.12
Unnao	350.72	85.32	32.91	8.01	19.88	4.84	7.54	1.83
Raebareli	332.64	83.55	43.18	10.85	11.99	3.01	10.30	2.59
Sitapur	387.53	66.16	54.79	9.35	26.03	4.44	117.43	20.05
Hardoi	502.68	81.83	41.42	6.74	33.92	5.52	36.31	5.91
Kheri	396.82	58.09	29.72	4.35	42.84	6.27	213.69	31.28
Faizabad	183.37	81.48	15.80	7.02	2.99	1.33	22.88	10.17
Ambedkar Nagar	236.49	88.61	14.21	5.33	2.87	1.08	13.31	4.99
Sultanpur	333.51	83.92	43.20	10.87	4.04	1.02	16.65	4.19
Barabanki	322.83	78.83	47.24	11.53	9.85	2.41	29.62	7.23
Gonda	353.23	79.50	34.11	7.68	7.45	1.68	49.51	11.14
Balrampur	204.06	66.27	40.85	13.27	17.36	5.64	45.64	14.82
Bahraich	384.86	80.58	59.74	12.51	10.46	2.19	22.53	4.72
Shravasti	167.12	81.64	29.70	14.51	4.29	2.09	3.61	1.76
Uttar Pradesh	17352.35	74.40	2726.33	11.69	776.00	3.33	2466.97	10.58

Table 5: Districtwise Area under Cereals, Pulses, Oilseeds and Cash Crops in Uttar Pradesh-2001-2005

Source: Data obtained from the Directorate of Agriculture, U.P., Lucknow. Pratapgarh, Muzaffarnagar, Jaunpur, S. R. Nagar, Varanasi, Ballia, Mau, Allahabad, Azamgarh, Chandauli, Ghazipur have area below 4 percent.

#### 1.2.4. Cash Crops

Cultivation of cash crops play an important role in the agricultural economy covered 2428.34 thousand hectares of land and accounted for 10.20 percent of total cropped area which is less than the area under cereal and pulse crops but higher than oilseeds crops. During 1996-2000, cash crops show area above 40 percent in 4 districts of namely, Muzaffarnagar, Meerut, Baghpat and Bijnor and 3 districts of J. P. Nagar, Saharanpur and Ghaziabad having area in between 30 and 40 percent. There were 3 three districts of Kheri, Kushi Nagar and Moradabad have area in between 20 and 30 percent and area in between 10 and 20 percent found in districts of Bareilly,

Farrukhabad, Sitapur, Kannauj, Pilibhit, Bulandshahar and Shahjahanpur. Area under cash crops below 10 percent marked in districts of Rampur, Basti, Barabanki, Budaun, Firozabad, Faizabad, Deoria, Azamgarh, Mau, Maharajganj, Ghazipur, Jaunpur, Ambedkar Nagar, Ballia, Varanasi, Hatharas, Hardoi, Balrampur, Mathura, Kanpur (urban), Gonda, Agra, Sultanpur, Kaushambi, Etah, Mainpuri, S. K. Nagar, Lucknow, Fatehpur, S. R. Nagar, Bahraich, Aligarh, Gorakhpur, Allahabad, Etawah, Kanpur (rural), G. B. Nagar, Raebareli, Pratapgarh, Auraiya, Unnao, Siddharth Nagar, Mirzapur, Shravasti, Chandauli, Hamirpur, Jalaun, Sonbhadra, Mahoba, Chitrakut, Lalitpur, Banda and Jhansi.

During 2001-2005, Cash crops have covered 2466.97 thousand ha. (10.58 percent) of total cropped area. Cash crops show area above 20 percent in districts of Muzaffarnagar, Meerut, Bijnor, Baghpat, Saharanpur, Ghaziabad, J. P. Nagar, Kheri, Kushi Nagar and Sitapur. There were 4 districts of namely, Farrukhabad, Bareilly, Kannauj and Moradabad having area in between 15 and 20 percent. The districts of Balrampur, Bulandshahar, Pilibhit, Basti, Gonda, Faizabad Firozabad show area in between 10 and 15 percent and 13 districts show area in between 5 and 10 percent, these are namely, Shahjahanpur, Hatharas, Agra, Rampur, Barabanki, Budaun, Maharajganj, Varanasi, Hardoi, Azamgarh, Jaunpur, Kanpur (urban) and Mau. There 36 districts show area under cash crops below 5 percent . These districts are namely, Ambedkar Nagar, Deoria, Bahraich, Mathura, Ballia, Ghazipur, Sultanpur, Mainpuri, Etah, Etawah, Aligarh, Fatehpur, Kaushambi, G. B. Nagar, Lucknow, S. K. Nagar, S. R. Nagar, Raebareli, Pratapgarh, Allahabad, Gorakhpur, Auraiya, Siddharth Nagar, Unnao, Shravasti, Kanpur (rural), Mirzapur, Hamirpur, Chandauli, Jalaun, Mahoba, Sonbhadra, Chitrakut, Banda, Lalitpur and Jhansi.

## 2. Conclusion

The general land use pattern with reference to area under forests, barren lands, land under non-agriculturable uses, culturable waste lands, permanent pasture lands, land under miscellaneous uses, current fallow lands, other fallow lands and net sown area was considered. There is an increase in area under non-agriculturable uses from 8.78 percent (1996-2000) to 10.53 percent (2001-2005), current fallow lands from 3.65 percent (1996-2000) to 4.69 percent (2001-2005) and net sown area from 60.53 percent (1996-2000) to 69.53 percent (2001-2005). The area under forest lands, barren lands, culturable waste lands, permanent pasture lands, land under miscellaneous uses and other fallow lands show a decreasing trend.

Land use patterns show variations in the state with reference to cereals, pulses, oilseeds and cash crops. Cereal crops covered area 17,559 thousand ha. (73.76 percent) during 1996-2000 and 17352.35 thousand ha. (74.40 percent) during 2001-2005. Area under cereal crops show a decrease in area but its share in percent shows an increasing trend. Pulses and oilseeds show a decrease in area but area under cash crops slightly increased from 10.2 percent (1996-2000) to 10.58 percent (2001-2005). There has been an increasing trend in rice and wheat, and shows an increased production in high value crops, at the expense of more traditional crops. While area under rice, wheat and sugarcane shows an increasing order, area under other crops as barley, jowar, and maize decreased.

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