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Optimising Land use Pattern for Sustainable Development: A Region-Wise Analysis of Uttar Pradesh

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Abstract

The continuous use, misuse and exploitation of land resources have resulted in its degradation and destruction. In order to sustain development process in the long- term, it is necessary to have a judicious allocation of land between various uses/ activities with regard to its sustainability and capability. The sustainable productivity of land resources happen to be the basis of all living being, therefore management , conservation and development of land resources are considered to be the most important aspects.

The present paper is based on region-wise-data of Uttar Pradesh. Analysis discusses the land use patterns and trends in all the regions of Uttar Pradesh. It provides information for different years pertaining to the area under nine land use categories. The analysis of Land use pattern in different regions of Uttar Pradesh is undertaken to identify important imbalances that requires immediate attention of planners. In view of this, paper presents a plan to shift the area from undesirable land uses to desirable land uses gradually over the years in the state. This suggestive model is expected to optimize the land use under different categories in the state. Paper concludes that Land Use Policy should aim at optimizing returns on long- term basis rather than meeting short term requirements on adhoc basis, land development/management programmes for generating higher aggregate income and critical input of water should include intensive land development and need to be reviewed so that regional disparities are reduced to a minimum and sustainable development among the regions could be attained.

Keywords: Land use pattern, sustainable development, land degradation

Introduction

Land is non-renewable resource base, which support all primary production system, as well as provides essential social environment in terms of shelter, road and other facilities. The physical, chemical and biological health of soil profile determines the capability of the land to serve socio-economic need of the society. The continuous use, misuse and exploitation of land resources have resulted in its degradation and destruction. In order to sustain development process in the long- term it is necessary to have a judicious allocation of land between various uses/ activities with regard to its sustainability and capability. The sustainable productivity of land resources happen to be the basis of all living being, therefore management , conservation and development of land resources are considered to be the most important aspects.

Review of Literature

Not a very good number of studies have analysed the issue in terms of presenting a model for required land use patter in Uttar Pradesh. However, some of the following studies have focused on the issue and problem of land use pattern and its desirable pattern.

In Bajpai, B. K. (2004) report, district- wise land use pattern was checked to seek the possibility of required improvement in the state of Uttar Pradesh. Singh, A. K. (1997) in his Perspective Plan for Conservation, Management and Development of Land Resources for Central Zone of India has given a detailed study of land use, the interaction of physical, historical and socio-economic factors reveal the dominance of agriculture in the State. In order to highlight the significance of particular land use category, land use orientation has been done.

Objectives

The analysis of this paper is based on region-wise-data of Uttar Pradesh. Region-wise analysis discusses the land use patterns and trends in all the regions of Uttar Pradesh. It provides information for different years pertaining to the area under nine land use categories. The analysis of Land use pattern in different regions of Uttar Pradesh is undertaken to identify important imbalances, which requires immediate attention of planners. In view of this, paper presents a plan to shift the area from undesirable land uses to desirable land uses gradually over the years in the state. Thus, paper attempts to present a model land use plan in all possible ways to arrive at a sustainable land use under different categories for which implementation becomes possible by the concerned departments.

Hypotheses

Out of total land uses of total geographical area, some components are required to be increased and some need to be decreased for acquiring the optimum land use pattern in course of time. The land uses, which require to be increased, are, forestland, water bodies, cultivated area and pastureland etc. for sustainable development. The land use under fallow land, existence of barren and degraded land and excessive and unjustified conversion of agricultural land into non- agricultural uses hampers the ideal future land use policy.

Methodology and Analytical Model

This suggestive model is expected to optimize the land use under different categories in the state. This plan has been formulated on the basis of three variable considerations. First, is the past change in the land use pattern in each of the nine fold classifications of land use. Second is the progress and the plan of the concerned departments for the management of different uses of land and consideration of financial implications involved therein. The third is related to the assessment of the situation that to what extent the past trend and achievements of the concerned departments would be agglomerated to arrive at the situation, which would be closer to the reality. On the basis of above considerations paper attempts to present a model land use plan with the use of secondary data.

Trends of Land use in Uttar Pradesh

Table 1 presents an overall analysis of the trends of land use in the four regions of Uttar Pradesh. The table presents percentage of land used under each category. It is based on the observations of the year 1980-81, 1990-91, 2000-01 and 2009-10. Table presents the percentage of land used by each category of land in all the regions and in Uttar Pradesh as a whole.

Table 1: Region-wise Trends in Land use Pattern of Uttar Pradesh

Land Use Category	1980-81					1990-91					2000-01					2009-10				
	Western	Central	Bundelkhand	Eastern	UP	Western	Central	Bundelkhand	Eastern	UP	Western	Central	Bundelkhand	Eastern	UP	Western	Central	Bundelkhand	Eastern	UP
Reporting Area	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Forest per cent	4.60	5.14	8.10	9.50	7.00	4.90	5.12	8.35	9.89	7.10	4.47	5.00	8.90	9.50	7.20	4.46	5.26	8.00	9.61	6.87
Barren Land	3.53	3.94	4.66	2.70	3.50	2.90	3.50	3.53	2.45	3.00	2.40	3.00	3.97	1.95	2.60	2.41	2.47	3.79	1.68	2.33
Land Under Non-Agricultural Uses	8.90	9.54	5.65	9.50	9.20	9.30	9.50	6.60	10.54	9.50	9.97	9.40	7.10	11.19	10.00	10.08	10.77	8.20	12.14	10.72
Culturable Waste	2.42	3.24	9.07	2.70	3.40	2.13	3.02	7.40	2.41	2.90	1.79	1.50	4.89	1.66	2.30	1.78	2.15	3.90	1.49	2.01
Permanent Pasture and Miscellaneous Trees	1.03	3.35	1.76	2.80	2.7	0.97	2.56	0.89	1.99	1.70	1.05	0.80	0.58	2.50	1.70	1.04	2.13	1.39	2.30	1.74
Other Fallow	2.44	3.24	4.23	2.60	2.90	2.60	4.30	3.69	3.84	3.40	2.24	4.10	2.75	2.50	2.70	2.21	3.96	1.97	2.34	2.81
Current Fallow	3.64	6.31	5.02	4.80	3.9	3.20	7.00	3.93	4.54	4.50	2.44	10.10	4.50	4.50	4.20	2.44	6.89	4.00	6.03	4.50
Net Area Sown	73.44	65.24	61.51	65.40	67.4	74.00	65.00	65.61	64.34	67.90	75.64	66.10	67.31	66.20	69.30	75.58	66.37	68.75	64.41	69.02

Source: Statistical Diary, Planning Department, Government of UP of various years.

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Land under Forests

In the year 1980-81 forest area in U.P. constituted 7 per cent of the reporting area. Western region and Central region were below the state average whereas Bundelkhand and Eastern regions were above the state with respect to percentage area under forest. This trend continued during all the years under consideration. At the state level forestland increased by 0.10 per cent in the year 1990-91. In Western region, area under forest increased by 0.3 per cent to 4.9 per cent in 1990-91. In Central region, forests reduced by 0.02 per cent. In Eastern region, also forests increased from 9.5 per cent in 1980-81 to 9.89 per cent in 1990-91. In the year, 2000-01 forests in Western region decreased marginally to 4.47 per cent from 4.9 per cent in 1990-91. In this year forests depleted in Central and Eastern regions also. Forestland increased only in Bundelkhand region to 8.9 per cent. The percentage of forestland to the total reporting area has reduced to 6.86 from 7.20 per cent during the year 2009-10 in the state. Share of Western region remained constant at 4.47 per cent in the year 2000-2001 and 2009-10. In Central region forest, area has increased by 0.26 per cent. In Bundelkhand region area under forest has depleted by 0.9 per cent. Eastern region has registered a growth in the forest area by 0.11 per cent.

Barren Land

In the year 1980, 3.5 per cent of land in U.P. was barren which decreased to 2.33 per cent in the year 2009-10. In the year 1990-91 barren land reduced marginally to 3.0 per cent of reporting area. In 1980-81 Bundelkhand had maximum barren land with 4.66 per cent in total reporting area. Bundelkhand still has maximum share in barren land. However, the percentage of barren land has decreased to the level of 3.97 per cent in 2000-01 and further to 3.79 per cent in 2009-10.

Land under Non-Agricultural Uses

Land put to non-agricultural uses has increased in U.P. from 9.2 per cent in 1980-81 to 10.72 per cent in 2009-10. Land under this category has increased in Eastern region since 1980. It has increased from 9.2 per cent in 1980-81 to 12.14 per cent in 2009-10. In the year, 1980-81 Western and Bundelkhand regions were below the state level with respect to percentage of area under non-agricultural uses. This trend continued until 2009-10. All the regions showed increasing trend of land put to non-agricultural uses during period.

Land under Cultivable Waste

Cultivable wasteland continuously shows a declining trend in Uttar Pradesh during the year 1980-81 and 2009-10. It was 3.4 per cent of the total reporting area in the year 1980 which has come down to 2.9 per cent of the total reporting area in the year 1990-91. It further decreased to 2.3 per cent of the total reporting area in the year 2000-01. In the year 2009-10 culturable wasteland was 2.01 per cent of the reporting area. At the regional level, Western, Central and Eastern regions were below the state level in terms of percentage area under culturable waste during the year 1980-81. Only Bundelkhand has more percentage of culturable wasteland than the state level. In the year 1990-91 Central and Bundelkhand regions have more culturable waste than the state average. Only Bundelkhand has percentage of culturable wasteland above the state average during 2000-01. In the final year, i.e. 2009-10, Central and Bundelkhand regions again had share of culturable waste above the state average.

Land under Permanent Pastures and Miscellaneous Trees

Permanent pastures and miscellaneous trees comprised 2.7 per cent of the total reporting area in the year 1980-81 which declined to 1.7 per cent in 1990-91. It remained the same by the year 2000-01. The land under this

category increased marginally to 1.74 per cent during the year 2009-10 at the state level. Central region and Eastern region were above the state average in the year 1980-81 and 1990-91. In the year 2000-01 percentage of land under permanent pastures and miscellaneous trees was maximum in Eastern region (2.5 per cent) which was above the state per cent. A positive trend was seen in the year 2009-10. Central region and Eastern region were again found to be having more percent of permanent pastures and miscellaneous trees than the state average.

Land under Other Fallow

Other fallow land shows a fluctuating trend in the state over the years under consideration. It was 2.9 per cent of the total reporting area in the year 1980-81, which substantially increased to 3.4 per cent during the year 1990-91. It again reduced to 2.7 per cent in the year 2000-01. In the year, 2009-10 other fallow land increased to 2.81 per cent in the state as a whole. Central and Bundelkhand regions were above the state level in terms of area under fallow land during the years 1980-81, 1990-91, 2000-01 and 2009-10. The proportionate area under other fallow land was found to be lower in Western and Eastern regions as compared to the state during all the years except the year 1991 when the percentage area under other fallow as high in Eastern region as compared to the state.

Land under Current Fallow

Current fallow land in U.P. as a whole comprised 3.9 per cent of reporting area in 1980. It increased to 4.5 per cent in the year 1990-91. In the year 2000-01, it further decreased marginally to 4.2 per cent and again increased to 4.5 per cent in the year 2009-10. Central and Eastern regions have depicted more percentage land under this category during all the reference years.

Net Area Sown

Uttar Pradesh had 67.4 per cent land as net area sown in the year 1980-81, which increased marginally to 67.9 per cent in the year 1990-91. This has further increased to 69.3 per cent in the year 2000-01 and remained constant till 2009-10. Only Western region has the percentage net sown area above the state average during all the years under consideration.

Period-Wise Shift in Area Under Each Land Use

In this section period-wise shifts in area under different land use categories have been analyzed in the four regions of Uttar Pradesh. The entire period considered over here is the time span of 25 years. The shifts have been judged during the year 1990 over the years 1980, 2000 over the year 1990, 2010 over the year 2000 and 2010 over the year 1980.

Area under forests increased by 3.06 per cent or 51600 hectare over the first time period. The contribution of Western region and Eastern region was high during this period. In the next period of 2000 over 1990 the area under forest declined by 2.72 per cent in the state. Maximum decline was in Western region during this period. There was a further decline (-0.12 per cent) in area under forest in the last phase (during the years 2000-2010) of our analysis. However, Bundelkhand had a maximum negative shift of -11.9 per cent, Eastern region continued to have a negative shift of forest area since the year 2000. Western and Central regions have shown growth in the area under forests in the state during the period 2000 and 2010. Thus, there was an overall increase of 0.14 per cent in the area under category of forests in the period of 30 year with a positive shift seen in Central and Western regions. Regions having higher proportion of forests depict a declining trend – Eastern -0.5 per cent, Bundelkhand -1.54 per cent.

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Area under barren land has continuously depicted a desirable negative shift of 13 to 15 per cent in all the periods taken into consideration in the state. Thus in the period of 30 years barren land in Uttar Pradesh has reduced by -37.6 per cent. Almost all the regions have witnessed the change. The decline in area is found to be the maximum in Western region in all the periods. Other regions have also been able to contribute in reduction of land under this category by diverting it to other uses. The decline in the area varied from -4.93 percent in Bundelkhand in the year 1990 to 2000 to above 20 per cent in Eastern and Central regions in different periods under consideration.

This can be attributed to the diversion of land put to non-agricultural uses which grew by 10.87 per cent in Eastern region followed by 16.81 per cent in Bundelkhand, 4.87 per cent in Western region during the first time period. Area put to non-agricultural purposes was observed to be increasing further by 6.23 per cent, 7.51 per cent and 4.76 per cent respectively in the same region as per land use data of 2000 over 1990. The area under this category has shown negative shift in both the periods in Central region only. This situation has resulted in a rise of land under this category by 6.92 per cent in first period and 4.41 per cent in the second period in the state. In the latest period of 2000 to 2010 there was an increase of 9.78 per cent in land put to non-agricultural uses in Uttar Pradesh which turns out to be highest among the three periods under consideration. All the four regions witnessed a growth in this category ranging from a lowest of 7.73 per cent in Eastern region to 19.23 per cent in Bundelkhand region. Thus, the above-mentioned situation has resulted in an increase of 22.5 per cent in area put to non-agricultural uses in Uttar Pradesh since 1980.

In case of area under permanent pastures and miscellaneous trees there was a tremendous decline of -32.64 per cent in Uttar Pradesh during the period 1980 to 1990. Bundelkhand depicted a maximum decline of -94.36 per cent followed by Eastern region (-40.18 per cent). The picture was rather fair in the second time period of 2000 over 1990 when the land under this category showed a positive shift of 6.10 per cent in Uttar Pradesh owing to the positive contribution of Eastern region (27.44 per cent) and Western region (3.00 per cent). But the situation again became dismal as signs of further decrease in this category of land used were witnessed in the state (-4.20 per cent). In fact, Western region followed by Eastern and Central regions had shown a decline of -16.74 percent, -9.62 per cent, and -6.08 percent respectively in area under this category. An increase of 137.40 per cent area under permanent pastures and miscellaneous trees was found only in Bundelkhand during this period. Thus, there was an overall decline of 23.44 per cent in area under permanent pastures and miscellaneous trees over the years 1980 – 2010 in the state. The highest decline of 36.72 per cent was seen in Central region followed by Bundelkhand region as is evident from Table 2.

Other fallow land showed a downward shift in all the three periods in the state. Maximum decline was witnessed in the period 2000 over 1990 of -23.24 per cent. Though Bundelkhand had a highest decline in the first two periods among the regions of -20.63 per cent and -32.18 per cent in both the periods respectively yet it was preceded by Western region in the period of 2010 over 2000 which faced a decline in this category by -26.13 per cent as compared to -18.43 per cent in Bundelkhand region (Table 2). Land under other fallow has decreased by -16.13 per cent in Uttar Pradesh in the period of 30 years. Bundelkhand experienced a maximum decline in this period while the period of 1990 to 2000 experienced maximum decline of -23.24 per cent.

Area under current fallow experienced a decline of -8.06 per cent during the period of 30 years. Maximum decline was experienced in the period 1990 over 1980. In the first time period Eastern region had the maximum decline of -36.15 per cent. During the period 2000 over 1990, Western region witnessed maximum decline in this category of land use. Eastern region again experienced maximum increase in the period 2010 over 2000 with -34.61 per cent which resulted in an increase of 19.27 per cent of current fallow in the state in this period.

Culturable wasteland decreased by -45.41 per cent during the overall period of 30 years in the state. Maximum decline was witnessed in Bundelkhand region followed by Eastern region. Culturable wasteland depicted an increase of 20 per cent during the period 1980-81 to 1990-91, where Central region contributed the most with 41.87 per cent. Only Bundelkhand depicted a decline of -12.92 per cent in this time period. But due to increase in the demand for more land for various uses culturable wasteland declined in the successive time periods. There was a decline of -19.15 per cent in th e second time period due to the contribution of -26.47 per cent reduction in the area put under this category in Eastern region. Western region contributed the highest to the decline (-22.58 per cent) of land under culturable waste in 2010 over 2000. Thus, reduction of -17.61 per cent land was seen in the state during this period.

The agricultural land increased successively in the first two periods in the state by 0.68 per cent and 1.14 per cent respectively. It declined marginally by -0.81 per cent in the recent period of 2010 over 2000 indicating the saturation of quantum of agricultural land. In the first period, Bundelkhand and Western regions contributed towards the positive shift of agricultural land with 5.64 per cent and 0.94 per cent. In the second period all the regions depicted a positive shift with Bundelkhand having the maximum percentage of increment (3.26 per cent). In the third time period of 2000 to 2010 the regions which comprise maximum portion of agricultural land in Uttar Pradesh namely Western and Eastern regions experienced a negative shift of -0.47 per cent and -3.34 per cent respectively leading to a decline in the overall stage percent. Net sown area had an overall increase of 1 per cent during the period of 30 years.

Table 2: Period- wise Shift in Area under Each Land Use

Land Use Category		Eastern	Bundel-khand	Central	Western	U.P
Forest	1990 over 1980	28966	6843	38	15753	51600
		(3.51)	(2.85)	(0.02)	(4.09)	(3.06)
	2000 over 1990	-26685-	18068	1711	-40260-	-47166-
		(3.13)	(7.31)	(0.73)	(10.03)	(2.72)
	2010 over 2000	-2694-	-28606-	4341	24892	-2067-
		(0.33)	(11.90)	(1.83)	(6.89)	(0.12)
	2010 over 1980	-413-	-3695-	6090	385	2367
		(0.05)	(1.54)	(2.59)	(0.10)	(0.14)
Barren Land	1990 over 1980	-25368-	-14399-	-22879-	-49284-	-111930-
		(10.72)	(10.41)	(12.47)	(16.84)	(13.15)
	2000 over1990	-43065-	-6111-	-18389-	-48003-	-115568-
		(20.38)	(4.93)	(11.45)	(19.72)	(15.64)
	2010 over 2000	-24201-	-5651-	-28960-	-35015-	-93827-
		(14.39)	(4.09)	(20.37)	(17.92)	(15.05)
	2010 over 1980	-92634-	-26161-	-70228-	-132302-	-321325-
		(39.15)	(18.92)	(38.28)	(45.20)	(37.76)
Land under	1990 over 1980	89148	28170	-3562-	35710	149466
non Agricultural uses		(10.87)	(16.81)	(0.81)	(4.87)	(6.92)
	2000 over 1990	56689	14701	-6110-	36581	101861
		(6.23)	(7.51)	(1.40)	(4.76)	(4.41)
	2010 over 2000	74691	32223	63947	65141	236002
		(7.73)	(19.23)	(14.86)	(8.09)	(9.78)
	2010 over 1980	220528	75094	54275	137432	487329
		(26.89)	(44.81)	(12.33)	(18.74)	(22.55)

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Land Use Category		Eastern	Bundel-khand	Central	Western	U.P
Permanent	1990 over 1980	-68878-	-25348-	-35067-	-2070-	-131363-
pastures and Miscellaneous Trees		(40.18)	(94.36)	(29.33)	(2.50)	(32.64)
	2000 over 1990	47047	-9573-	-15387-	2481	24568
		(27.44)	(35.64)	(12.87)	(3.00)	(6.10)
	2010 over 2000	-21027-	23758	-6328-	-14246-	-17843-
		(9.62)	(137.40)	(6.08)	(16.74)	(4.20)
	2010 over 1980	-42858-	-11163-	-56782-	-13835-	-124638-
		(17.84)	(21.38)	(36.72)	(16.33)	(23.44)
Current fallow	1990 over 1980	-221013-	-32547-	29007	-48619-	-273172-
		(36.15)	(21.84)	(9.91)	(16.43)	(20.25)
	2000 over 1990	-6491-	17274	-16590-	-49759-	-55566-
		(1.66)	(14.83)	(5.16)	(20.13)	(5.16)
	2010 over 2000	132862	-15481-	11208	68064	11208
		(34.61)	(10.39)	(3.67)	(34.47)	(3.67)
	2010 over 1980	-94642-	-30754-	23625	-30314-	23625
		(15.48)	(8.07)	(8.07)	(10.25)	(8.06)
Culturable Waste	1990 over 1980	67797	-16209-	58915	26327	136830
		(30.31)	(12.92)	(41.87)	(13.56)	(20.00)
	2000 over 1990	-77173-	-27740-	-13494-	-41228-	-159635-
		(26.47)	(25.38)	(6.76)	(18.70)	(19.45)
	2010 over 2000	-15502-	-29524-	-17682-	-32783-	-95491-
		(10.82)	(10.97)	(15.17)	(22.58)	(17.36)
	2010 over 1980	-106497-	-153745-	-50027-	-67722-	-377991-
		(45.45)	(57.15)	(33.59)	(37.59)	(45.41)
Other fallow	1990 over 1980	-46408-	-55510-	-10181-	-3909-	-116008-
		(19.81)	(20.63)	(6.84)	(2.17)	(13.94)
	2000 over 1990	-44587-	-68711-	-22164-	-31030-	-166492-
		(23.73)	(32.18)	(15.98)	(17.61)	(23.24)
	2010 over 2000	-13313-	-23125-	-4223-	-46843-	-87504-
		(6.21)	(18.43)	(2.27)	(26.13)	(13.23)
	2010 over 1980	-22689-(10.14)	-67074-	41198	-61744-	-110309-
			(53.44)	(29.28)	(31.80)	(16.13)
Net sown Area	1990 over 1980	-35191-	102798	-11454-	56907	113060
		(0.62)	(5.64)	(0.38)	(0.94)	(0.68)
	2000 over 1990	99845	62861	15073	10999	188778
		(1.78)	(3.26)	(0.50)	(0.18)	(1.14)
	2010 over 2000	-190785-	44186	39239	-28730-	-136090-
		(3.34)	(2.42)	(1.31)	(0.47)	(0.81)
	2010 over 1980	-126131-	209845	42858	39176	165748
		(2.23)	(11.50)	(1.43)	(0.65)	(1.00)

Source: Based on the data from statistical abstract, Planning Department, Government of U.P., Lucknow.

The analysis of data reveals serious imbalances in the land use pattern in four regions of Uttar Pradesh. The standard land use classification can be grouped into productive/desirable and non-productive/undesirable land use categories. The productive categories of land use are the land put to non-agricultural uses, permanent pastures and area under miscellaneous trees and groves, net area sown and land under forests. The non-

productive/undesirable characteristics of land are found in barren land, culturable wasteland, current fallow land and other fallow lands. In view of this, we can conclude that the pace of decrease of land used for non-productive purpose has to be increased and diverted towards plantation of forests and pastures and land put to non-agricultural purposes. The land put to non-agricultural uses should cater the need for infrastructural development rather diverting for wasteful purposes. More developed architectural technologies should be used to create apartments with vertical elevations so that land use is diverted towards ecological purposes. It is also recommended to use the wastelands for land for various non-agricultural purposes.

In order to cope up the existing imbalances in the land use across the regions and over a period of 30 years (reference period of the study) in the state of Uttar Pradesh, a model land use plan has been formulated for each of the regions of the state. The plan for each region is different as there are variations in existing imbalances in each region. A reallocation of land use under different categories, as per our suggestive plan, may retain the balance in this respect in coming fifteen years.

Land Use Plan

A model land use plan has been prepared for the utilization of land for varying purposes for the four regions of the state from 2009-10 to 2024-2025. The plan has been prepared on three pragmatic considerations. First is the past change in land use pattern in each of the nine classifications of land use. Second is the progress and plan of the concerned departments for the management of different uses of land and consideration of financial implications involved.

Third is the assessment of the situation that to what extent the past trends and achievements of the concerned departments would be agglomerated to arrive at the situation which shall be closer to the reality.

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Table 3: Framework of Model Land Use Plan

Sl. No.	Land Use Category	Constituents of Proposed Land Use Plan of each category (2009-2010 to 2024-2025)
1.	Reporting Area	Constant
2.	Forest	Existing area + 0.50 per cent area of Net Area Sown + 2 per cent area of barren land + 0.50 per cent area of Non-Agricultural Uses + 1.50 per cent area of culturable waste + 0.50 per cent area of current fallow and 1 per cent area of other fallow.
3.	Barren Land	Existing area – 35 per cent rocky and ravines – 2 per cent went to Forest – 2 per cent went to Net Area Sown.
4.	Land Under Non-Agricultural Uses	Existing area – 0.50 per cent went to Forest + 2 per cent area of current, other and net area sown (Share of 2 per cent in each category, 8.78, 4.89 and 86.33 per cent).
5.	Culturable Waste	Existing area – 1.50 per cent area went to Forest – 7 per cent area diverted went to Net Area Sown
6.	Permanent Pasture	Constant
7.	Miscellaneous Trees	Constant

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Sl. No.	Land Use Category	Constituents of Proposed Land Use Plan of each category (2009-2010 to 2024-2025)
8.	Current Fallow	Existing area – 0.50 percent went to Forest – 8.78 per cent of share of 2 per cent went to non-agricultural uses – 64.21 per cent of share of 5 per cent of total fallow to be diverted to Net Area Sown
9.	Other Fallow	Existing area – 1.0 per cent area went to Forest – 4.89 percent share of 2 per cent went to non-agricultural uses – 35.79 per cent of share of 5 per cent of total fallow went to net area sown
10.	Net Area Sown	Existing area – 0.50 percent went to Forest – 86.33 per cent of share of 2 per cent went to non-agricultural uses + 2 per cent from Barren Land + 7 per cent from Culturable Waste + 5 per cent of both fallows.

Table 3 presents the framework that is developed to prepare the Model Land Use Plan of the four regions. A complete proposed Model Land Use Plan of Uttar Pradesh along with the four regions for the period 2009-2010 to 2024-2025 has been shown in Tables 4,5,6,7 and 8. The analysis of the Tables is as follows.

Model Land Use Plan of Uttar Pradesh

On the basis of above framework, area under forest which is to be referred as area under tree cover, which was 6.97 per cent in reporting area during 2009 in Uttar Pradesh shows continuous increasing trend and it reaches to 16.3 per cent of the reporting area by 2024-2025. Though by the year 2025, area under tree cover would be lower than the recommended norm of 30 per cent as envisaged in the National Forest Policy, but further increase beyond 6 per cent of tree cover would not be possible to achieve in the state, taking into consideration all the factors involved. Corresponding increase of area under forests and tree cover in the regions are 4.78 per cent in the year 2009 to 14.62 percent in Western region, 9.61 per cent forests in Eastern region would increase to 18.84 per cent. Central and Bundelkhand would depict a rise of area under forests to 15.24 per cent and 17.9 per cent respectively.

The plan reveals continuous decline in the area of barren land from 2009-2010 to 2024-2025. Its percentage in reporting area of Uttar Pradesh was 2.29 and it will come down to 1.5 per cent in the year 2024-2025. This will become possible by reducing the barren land in Western region from 1.99 to 1.25 per cent, in Central region it would decrease from 2.47 per cent to 1.25 per cent. In Eastern region it would decrease from the level of 1.68 per cent to 1.05 per cent. In addition, Bundelkhand region would show a decline from 3.79 to 2.38 per cent.

As the urbanization and industrialization are increasing, proposed area under non-agricultural uses would also increase in the state from 10.94 per cent in 2009-2010 to around 16.59 per cent during the year 2024-2025. Western region would show an increase from 10.78 to 16.3 per cent, Central region would show an increase in the area under the same category from 10.77 per cent to 16.33 per cent, Bundelkhand from 8.20 per cent to 12.43 per cent and Eastern region would face an increase in this category from 12.14 per cent to 18.93 per cent.

The percentage of area of culturable waste was 1.88 per cent in reporting area of the state in the year 2009-2010. It has been planned that would be largely converted to the cultivation and its share would be reduced to 0.29 per cent in the year 2024-2025. The percentage of culturable waste would decrease from 1.39, 2.15, 3.9, 1.49 to 0.22, 0.33, 0.60, 0.23 per cent in Western, Central, Bundelkhand and Eastern region respectively.

No change in the area of permanent pasture and miscellaneous trees has been proposed and it has been recommended that concerned departments should strive to maintain the status-quo of the existing area of both these uses of land.

The area under current fallow was substantial in the state. Its share in the reporting area was 5.03 per cent in the year 2009-2010. It has been planned to reduce the area of current fallow by 5 per cent in the year 2024-2025. The percentage of current fallow would decrease from 3.29, 6.89, 4.00, 6.03 per cent to 0.91, 1.89, 1.13, and 1.62 per cent in Western, Central, Bundelkhand and Eastern region respectively. The reduced area would be largely diverted to the net area sown in respective years. The similar plan was proposed in case of other fallow.

The proposed plan of utilization of eight categories of uses of land has bearing on the net area sown. The percentage of net area sown in the reporting area of the state was 68.93 per cent in 2009-10. Due to shifting of area within eight uses of land, net area sown would decrease in successive years after 2009-10 and its share in reporting area would decrease to 61.49 per cent in 2024-2025. The percentage of Net sown area would decrease 75.26, 66.36, 68.75 per cent, 64.7 per cent to 65.39 per cent, 61.62 per cent, 63.68 per cent, and 57 per cent in Western, Central, Bundelkhand and Eastern region respectively.

Table 4: Model Land Use Plan of Western region: 2009-2010 to 2024-2025

(In hectares)

Land use/Year	2009-10	2014-15	2019-20	2024-25
Reporting Area	8077960	8077960	8077960	8077960
	(100.00)	(100.00)	(100.00)	(100.00)
Forest	385973	818810.8	1003083	1180923
	(4.78)	(10.14)	(12.42)	(14.62)
Barren Land	160395	122984.6	110756.6	100765.4
	(1.99)	(1.52)	(1.37)	(1.25)
Land Under Non-Agricultural Uses	870668	1082566	1195241	1319642
	(10.78)	(13.40)	(14.80)	(16.34)
Culturable Waste	112435	42318.82	27141.82	17407.82
	(1.39)	(0.52)	(0.34)	(0.22)
Current Fallow	265520	136225.8	100066.5	73205.82
	(3.29)	(1.69)	(1.24)	(0.91)
Other Fallow	132408	64066.12	45822.46	32639.75
	(1.64)	(0.79)	(0.57)	(0.40)
Permanent Pastures and	70874	70874	70874	70874
Miscellaneous Trees	(0.88)	(0.88)	(0.88)	(0.88)
Net Area Sown	6079687	5779333	5524976	5282502
	(75.26)	71.06	(68.40)	(65.39)

Source: Calculated from data available in Statistical Abstract 2008.

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Table 5: Model Land Use Plan of Central region: 2009-2010 to 2024-2025

(In hectares)

Land use/Year	2009-10	2014-15	2019-20	2024-25
Reporting Area	4589609	4589609	4589609	4589609
	(100.00)	(100.00)	(100.00)	(100.00)
Forest	241306	492067.2	597723.8	699270.4
	(5.26)	(10.72)	(13.02)	(15.24)
Barren Land	113224	122984.6	110756.6	100765.4
	(2.47)	2.68)	2.41	2.20
Land Under Non-Agricultural Uses	494414	614741.6	678724.4	749366.6
	(10.77)	(13.39)	(14.79)	(16.33)
Culturable Waste	98889	37220.31	23871.82	15310.56
	(2.15)	(0.81)	(0.52)	(0.33)
Current Fallow	316427	162082	118955.6	86937.14
	(6.89)	(3.53)	(2.59)	(1.89)
Other Fallow	181909	87874.68	62796.14	44685.06
	(3.96)	(1.91)	(1.37)	(0.97)
Permanent Pastures and	97835	97835	97835	97835
Miscellaneous Trees	(2.13)	(2.13)	(2.13)	(2.13)
Net Area Sown	3045605	3011909	2933373	2828025
	(66.36)	(65.62)	(63.91)	(61.62)

Source: Calculated from data available in Statistical Abstract 2008.

Table 6: Model Land Use Plan of Bundelkhand region: 2009-2010 to 2024-2025

(In hectares)

Land use/Year	2009-10	2014-15	2019-20	2024-25
Reporting Area	2958534	2958534	2958534	2958534
	(100.00)	(100.00)	(100.00)	(100.00)
Forest	236672	398541.6	465553.8	529496.8
	(8.00)	(13.47)	(15.74)	(17.90)
Barren Land	112128	85975.38	77427.08	70442.51
	(3.79)	(2.91)	(2.62)	(2.38)
Land Under Non-Agricultural Uses	242664	301722.2	333125.7	367797.7
	(8.20)	(10.20)	(11.26)	(12.43)
Culturable Waste	115284	43391.14	27829.57	17848.92
	(3.90)	(1.47)	(0.94)	(0.60)
Current Fallow	118299	61232.67	45222.92	33299.47
	(4.00)	(2.07)	(1.53)	(1.13)
Other Fallow	58428	28523.03	20511.83	14706.51
	(1.97)	(0.96)	(0.69)	(0.50)
Permanent Pastures and	41049	41049	41049	41049
Miscellaneous Trees	(1.39)	(1.39)	(1.39)	(1.39)
Net Area Sown	2034010	1998099	1947814	1883893
	(68.75)	(67.54)	(65.84)	(63.68)

Source: Calculated from data available in Statistical Abstract 2008.

Table 7: Model Land Use Plan of Eastern region: 2009-2010 to 2024-2025

(In hectares)

Land use/Year	2009-10	2014-15	2019-20	2024-25
Reporting Area	8575191	8575191	8575191	8575191
	(100.00)	(100.00)	(100.00)	(100.00)
Forest	823826	1255719	1438959	1615585
	(9.61)	(14.64)	(16.78)	(18.84)
Barren Land	143998	110412.1	99434.09	90464.29
	(1.68)	(1.29)	(1.16)	(1.05)
Land Under Non-Agricultural Uses	1040757	1294051	1428737	1577441
	(12.14)	(15.09)	(16.66)	(18.40)
Culturable Waste	127822	48110.25	30856.25	19790.13
	(1.49)	(0.56)	(0.36)	(0.23)
Current Fallow	516707	262167.8	191318	138866.6
	(6.03)	(3.06)	(2.23)	(1.62)
Other Fallow	201013	96180.15	68338.85	48295.07
	(2.34)	(1.12)	(0.80)	(0.56)
Permanent Pastures and	197444	197444	197444	197444
Miscellaneous Trees	(2.30)	(2.30)	(2.30)	(2.30)
Net Area Sown	5523624	5311108	5120105	4887307
	(64.47)	64.41	59.71	(57.00)

Source: Calculated from data available in Statistical Abstract 2008.

Table 8: Model Land Use Plan of Uttar Pradesh: 2009-2010 to 2024-2025

(In hectares)

Land use/Year	2009-10	2014-15	2019-20	2024-25
Reporting Area	24201294	24201294	24201294	24201294
	(100.00)	(100.00)	(100.00)	(100.00)
Forest	1687777	2965139	3505320	4025275
	(6.97)	(12.25)	(14.48)	(16.63)
Barren Land	529745	442356.7	398374.4	362437.6
	(2.19)	(1.83)	(1.65)	(1.50)
Land Under Non-Agricultural Uses	2648503	3293081	3635828	4014247
	(10.94)	(13.61)	(15.02)	(16.59)
Culturable Waste	454430	171040.5	109699.5	70357.43
	(1.88)	(0.71)	(0.45)	(0.29)
Current Fallow	1216953	621708.27	455563.02	332309.03
	(5.03)	(2.57)	(1.88)	(1.37)
Other Fallow	573758	276643.98	197469.28	140326.39
	(2.37)	(1.14)	(0.82)	(0.58)
Permanent Pastures and	407202.00	407202.00	407202.00	407202.00
Miscellaneous Trees	(1.68)	(1.68)	(1.68)	(1.68)
Net Area Sown	16682926.00	16100449.00	15526268.00	14881727.00
	(68.93)	(66.53)	(64.15)	(61.49)

Source: Calculated from data available in Statistical Abstract 2008.

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Summary

Land Use Policy should aim at optimizing returns on long term basis rather than meeting short term requirements on adhoc basis, land development/management programmes for generating higher aggregate income and critical input of water should include intensive land development and need to be reviewed so that regional disparities are reduced to a minimum.

It is evident from the statistics present in the above tables that in order to attain the desirable allocation under different categories of nine fold classification we have to make calculated efforts because according to the statistics of 2009-10 the situation is not very conducive for achieving a desirable land use pattern. To increase the proportion of forest land from ecological point of view social forestry, agro forestry, farm forestry should be encouraged to have an effective coverage. The increase in fallow land is no doubt alarming and calls for effective measures. Permanent pastures and grazing land also demands effective planning, culturable wasteland is to be minimized and brought under cultivation to attain desirable proportion. Land under miscellaneous tree crops and groves have to be enhanced considerably.

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