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Temporal changes in the land use pattern of Muzaffarnagar district of Uttar Pradesh from 1997 to 2017

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Abstract
The land use pattern under any region changes as time passes, there are so many reasons behind it. The most important factor behind this land use change is population growth. As population increased in an area, hence the demand of food crop as well as other crops also increase. In this scenario, to match the food and other demand either we have to increase the production of crop per hectare or per unit or we have to increase the land under crops. If we have to increase the land under crops, then we have to acquire land, which is being used for other purposes, in that case land use of the region would definitely change. Other factors behind the land use change are road construction, urban expansion, forest cover depletion, conversion of fallow land for other useful activities. In this paper the researcher has selected the Shamli district of Uttar Pradesh to study the land use changes in the last 20 years (from 1997 to 2017). Land use change has been recorded in the Shamli district in the last 20 years.

Keywords: Population growth, land use pattern, net sown area, agriculture practice

Introduction
As population growth or population increases in an area the demand for food increases naturally or automatically. As food is the basic or main need for human to survive in this world, as through food human gets, his daily requirement of calories. Growing demand of food and other crops create pressure on government and farmers who are responsible or have a duty to arrange or produce those items. That demand definitely changes the land use pattern of that area or region. As population increases the demand of new colonies or new cities increases, that demand needs to be satisfied from the available land. That available land can be fallow land or agricultural land as it depends on the location of colony or city. So this demand of new construction again has an effect on land use of the region.
For new agricultural land, land has to be arranged from the fallow land or land under forest or land under orchard. If government has to build a new highway or wants to widen the road, again that land comes from the agriculture land in most of the cases. It creates a pressure on agricultural land. In either case, as time passes, and population increase the land use change happens in an area. For this research paper blockwise study of Shamli district has been done.

Geographical Study of the Area
Shamli district is a newly created district. Earlier it was a part of Muzaffarnagar district in western Uttar Pradesh. Shamli was a Tehsil. In newly created Shamli district there are 5 blocks, which are carved out of Muzaffarnagar district, they are namely Shamli, Kandhala, Kairana, thanabhawan and Uun. There are 3 tehsils, namely Shamli, Kairana and Uun. National capital New Delhi is just 100 kms away from the Shamli district headquarter and this district is situated on New Delhi- Shamli highway. In Shamli district's north is Saharanpur, in south Baghpat, in east Muzaffarnagar and in west Haryana state.

Objective of the Study
a) Is it true that population growth affect, land use change?
b) To study the change, in the forest land under Shamli district.
c) To study the change, in the fallow land under Shamli district.

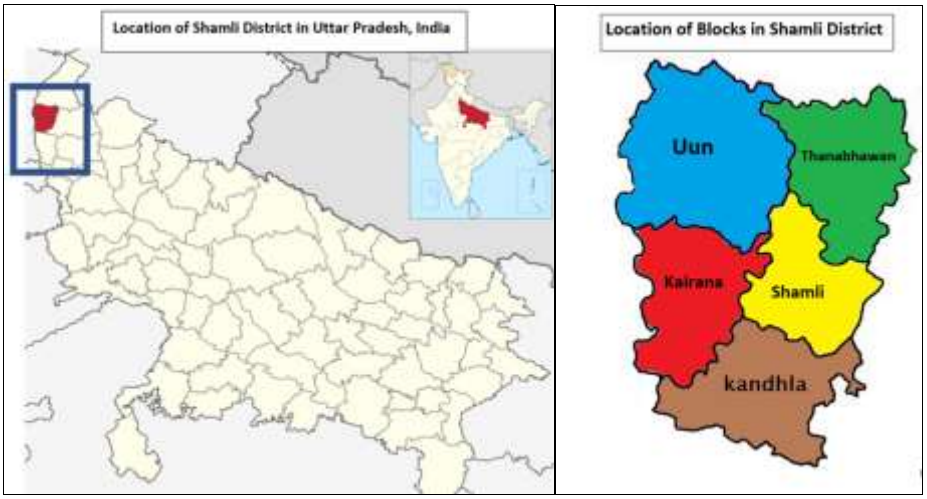

Table 1: Blocks and Tehsils of Shamli district

	Blocks [3]	Tehsils [4]
1	Shamli	Shamli
2	Thanabhawan	Kairana
3	Kandhala	Uun
4	Kairana	
5	Uun	

Methodology

The help of Secondary data has been taken to publish this research paper. The majority of the data has been taken from Uttar Pradesh government website Spider Patrika. Other than the spider patrika, data has been received from various government and private website.

Study has been done in blockwise manner. 20 years data (from 1997-98 to 2012-20) has been analysed for this research paper. To make the maps help of Remote sensing and GIS software QGIS has been taken. MS Word software is used for typing purpose as well as to make the table.

Results and Discussion

There are 5 blocks in Shamli district. In 1997 the blocks were the part of the Muzaffarnagar district. Only the data of those blocks are taken which are the part of the present Shamli district. In the following tables data of Shamli district has been given:

Table 2: Land Use Classification of Different Blocks of Shamli District in 1997 [1]

Block	Area of Block	Cultivated Land (Net Area Sown)		Uncultivated Land		Not available for cultivation (Road and City)		Forest & Garden	
		Area	%	Area	%	Area	%	Area	%
Uun	35923	29553	82.2	2583	7.2	3184	8.8	603	1.7
Thanabhawan	21459	18161	84.6	1351	6.3	2132	9.9	85	0.3
Shamli	17678	15388	84	423	2.4	1788	10.1	79	0.4
Kairana	23010	18608	80.8	1638	7.1	2387	10.3	377	1.6
Kandhala	23126	19764	85.4	993	4.3	2280	9.8	89	0.3
Total Area	121196	101474	83.7	6988	5.7	11771	9.7	1233	1

Temporal Changes in the Cultivated Land in the Different Blocks of Shamli district from 1997 to 2017

From 1997 to 2017, the cultivated land has increased from 83.7% to 85.6% of the total land area of Shamli district. Maximum percentage growth is in Uun block with 8% increase, and area under cultivated land is also increased in Thanabhawan and Kairana. Only in two blocks out of five, area under cultivated land decreased, those blocks are Shamli and Kandhala.

Temporal Changes in the uncultivated Land in the Different Blocks of Shamli district from 1997 to 2017

Uncultivated land contains fallow land, land not suitable for agriculture and other land which is not being used for agriculture. In 20 years, the uncultivated land has decreased from 5.7% to .3% of the total land area of Muzaffarnagar district. Uncultivated land decreased in all the blocks. The maximum decrease is in Uun, Thanabhawan and Kairana block whereas the minimum decrease is in Kandhala block where the percentage decrease is just 0.3% in 20 years.

Table 3: Land Use Classification of Different Blocks of Shamli District in 2017 [2]

Block	Area of Block	Cultivated Land (Net Area Sown)		Uncultivated Land		Not available for cultivation (Road and City)		Forest & Garden	
		Area	%	Area	%	Area	%	Area	%
Uun	40242	36576	90.9	123	0.3	2234	5.5	1309	3.2
Thanabhawan	21093	17993	85.3	103	0.5	1909	9	1088	5.2
Shamli	23356	18227	78	90	0.4	3988	17	1057	4.5
Kairana	23712	20351	85.8	79	0.3	2089	8.8	1193	5
Kandhala	10405	8581	82.4	44	4	1009	9.7	761	7.3
Total Area	118808	101728	85.62	439	0.3	11229	9.4	5412	4.5

Temporal Changes in the Land not available for Cultivation in the Different Blocks of Shamli district from 1997 to 2017

This category contains the land which is not available for cultivation and which can not be available for cultivation as this land comes under road and housing use and hence can not be use for agricultural purpose. In 20 years the land for Shamli district decreased by just 0.3% point. In out of 5 blocks only in Shamli block the land under this category has increased and in all other 4 blocks the land under this category has decreased. The maximum decrease recorded in Uun block (3.3%) whereas the minimum decrease has recorded in Kandhala block which is just 0.1% in 20 years.

Temporal Changes in the Forest and Garden in the Different Blocks of Shamli district from 1997 to 2017

This category contains land under forest, meadows and garden. The land under this category increased from 1% of total land in 1997 to 4.5% of total land in 2017, which is a good sign, as presence of forest relay important for ecosystem. The area under this category has increased in all the blocks of Shamli district. The maximum increase is in Thanabhawan, Shamli and Kandhala whereas minimum increase is in Uun and Kairana blocks.

Fig 2: Temporal Changes in the Land Use Pattern of Muzaffarnagar District of Uttar Pradesh from 1997 to 2017

Analysis

As we discussed earlier that as the population increase then either we have to increase the yield or productivity of the crop or we have to increase the area under the crops. The area under the crops has increased in Shamli district in the last 20 years. Although the increase is not as much as it should be, but there is big change in area under forest as area under forest just increased by 4.5 times in 20 years. It is a positive indication as area under forest is decreasing in all the parts of the world.

The area under uncultivated land has been decreased immensely in the last 20 years as share of uncultivated land has decreased from 5.7% in 1997 to only 0.3% in 2017. Maximum part of the uncultivated land has been shifted to land under forest and garden.

As we have seen, from the above data that land available for agricultural activity has reached nearly its saturation point so it is the high time that local government or state government should think about to increase the productivity of the land or yield per hectare to satisfy the need of the growing population. The increase productivity or yield would also increase the income of the farmers that would cause a positive turn in the life of population of the region or Shamli district as agriculture is the main occupation of the Shamli district.

Conclusion

Moreover, the substantial reduction in uncultivated land, which has decreased from 5.7% to a mere 0.3% of the total land area, underscores the efficient utilization of available land resources. Much of this formerly uncultivated land has been repurposed for forest and garden use, indicating a shift towards sustainable land management practices.

However, with the agricultural land nearing its saturation point, it becomes imperative for local and state authorities to focus on enhancing agricultural productivity and yield per hectare. This strategic approach not only addresses the needs of a burgeoning population but also holds the potential to uplift the socio-economic landscape of the region, given that agriculture remains the primary occupation in Shamli district.

In essence, while the data showcases positive strides in land use dynamics, it also serves as a call to action for policymakers to prioritize measures aimed at boosting agricultural productivity, thereby ensuring food security and prosperity for the residents of Shamli district.

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