

Sprawl of land Put to Non Agricultural Use, Environmental Concerns and Mitigation Strategies: a Case Study of Ambedkar Nagar District

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Abstract: Sprawl of land put to non agricultural uses comes under different forms such as infrastructural development, residential buildings, shops and markets, roads and railways, offices etc. It is a common phenomenon due to increasing population in the region. The sprawl in this land category was accelerated since 2005 and no doubt has an effect on local ecosystem of the region. The present paper tries to investigate the sprawl and its environmental concerns and suggest some mitigation strategies for the region.

Keywords: Environment, Land Put to Non Agricultural Use, Management, Sprawl

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I. INTRODUCTION

Land is one of the basic natural resource where man plans and executes his all social and economic activities. Over the period of time geographic pattern of land resource use is the outcome of concurrent interaction between the variable combinations of natural condition and human circumstances. The total land of an area used in different purposes comes under land cover or land use pattern. It forms the backbone of the socio-economic and cultural setup of the entire region and therefore becomes the central theme of all problems and policies pertaining to land. Barlowe and Johnson [1] believed land resource utilization as the pivot of land related problem and their planning, in fact 'land utilization is the process of exploiting the land-use that is applied to specific objectives'[2]. The word 'land use' was first used by Sauer [3], Jones and Finch used this word in his book published in 1925 but land use and planning was universally accepted after the extensive surveys of Stamp. Stamp [5] surveyed land use of Britain and publishes his research on land possibility, capacity and classification. In India in context to land use Shafi [6] did remarkable work. Apart from Shafi, Bhatia [7], Rao [8], Ali [9], Sinha [10] etc. did remarkable work on different aspect of land use. As far as land utilization is concerned it 'is the result of combination of natural and cultural factors' [11]. The availability of land resource in economic utilization is the reflection of technological development of society which is basically the indication of intensity of demand and supply. There are several agencies in India like 'National Thematic Mapping Organization' (NATMO), 'Soil Survey Department', 'Statistical Department' etc. who uses their own classification of land use but the present classification of 'land put to non agricultural use' is based upon on district statistical magazine on following classification of land use : net sown area, forest, barren and cultivable waste, fallow land which includes present fallow and other fallow land, barren cultivable land, land put to non agricultural use, pastures and area under bushes groves and garden.

'Sprawl has been loosely defined as dispersed and inefficient urban growth'[12]. Further Haze and Lathrop proposes five indicators associated with sprawl that is- (1) density of new urbanization; (2) loss of prime farmland; (3) loss of natural wetlands; (4) loss of core forest habitat; and (5) increase of impervious surface. Xi, He [13], Tavares, Pato [14], Miller [15], Zanganeh Shahraki, Sauri [16], Zhang, Chen [17] studied the potential impacts of sprawl on agricultural land and soil. MacDonald and Rudel [18] attempted to find a relationship between human sprawl and impact on forest cover and poses it a serious threat to our environment. Every inch sprawl on land put to non agricultural use reflects the shrinking areas of other important land use categories specially the agricultural land, forest land, pastures and areas under groves and gardens.

As we know land is the backbone of agricultural economies providing substantial economic and social benefits. Land use change is necessary and essential for economic development and social progress however it does not come without costs. Conversion of agricultural land, forests, pastures, areas under groves and gardens to non agricultural land use reduces the land available for crop production, timber production, fruit production, etc. and the reduction of pastures reduces the habit of animal husbandry. Other than the socio-economic change the most vulnerable thing is the degradation of ecosystem. The sprawl in land put to non agricultural uses can

have wide ranging and long term consequences. The sprawl in land put to non agricultural uses has been linked to many environmental problems, including air pollution, water pollution, and loss of wildlife habitat Soil erosion, salinization etc. Habitat destruction, fragmentation, and alteration associated with urban development have been identified as the leading causes of biodiversity decline and species extinctions [19]. In this way sprawl in land put to non agricultural uses despite some social benefits comes at a substantial cost to the environment that needs to be managed.

LOCATION AND EXTENT OF THE STUDY AREA

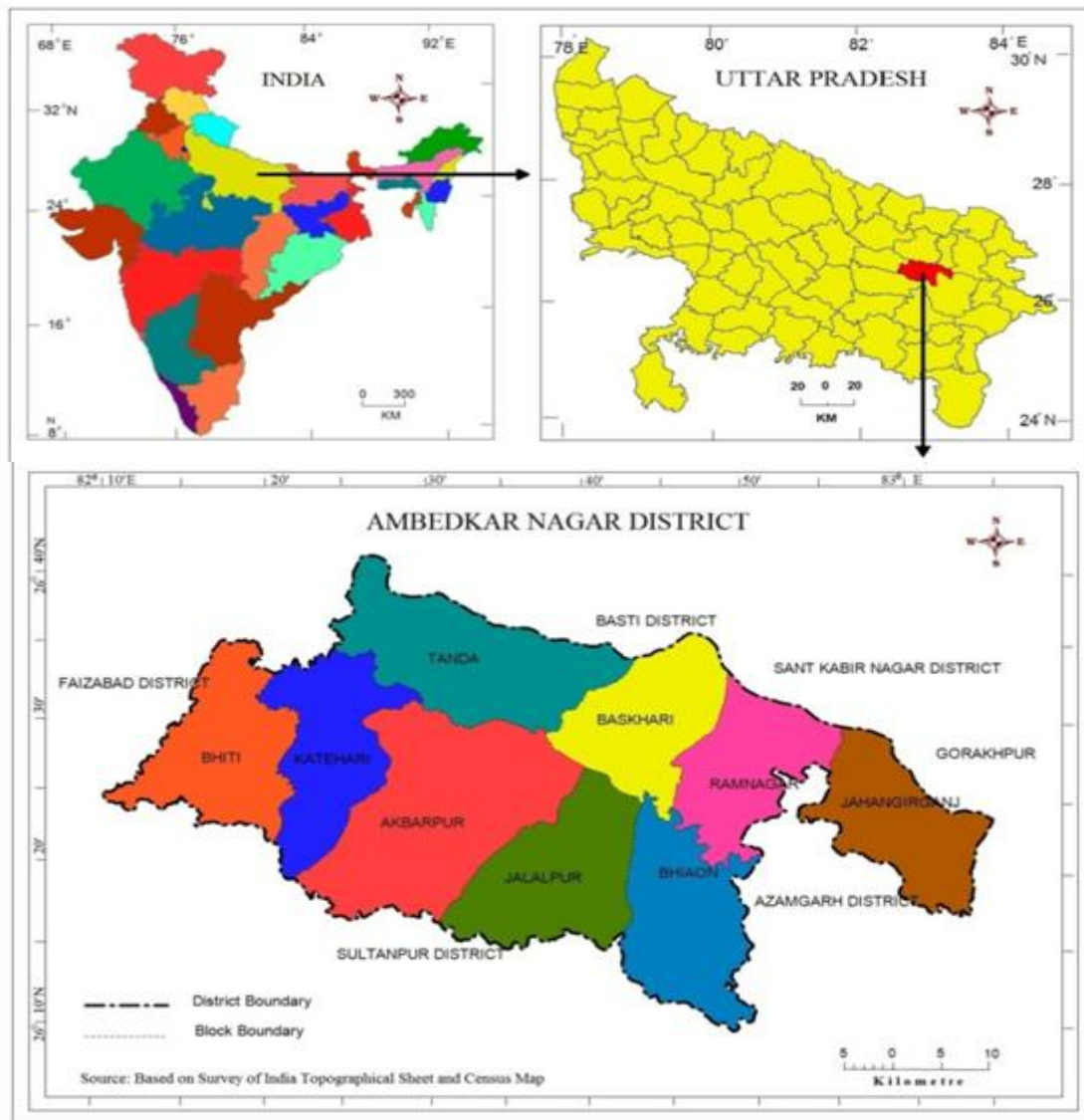


Fig.1

II. THE AREA

Ambedkar Nagar District is a part of Ganges plains situated in the Middle Eastern part of Uttar Pradesh. The district was constituted from the division of Faizabad district on 29th of September 1995 and named after Dr. Bhim Rao Ambedkar. The area under study lies between 26° 9' N - 26° 40' N latitudes and 82° 12'E – 83° 5'E longitudes and has the area of 2350 sq. kilometers. It is surrounded by six districts, clockwise from north these are Basti, Sant Kabir Nagar, Gorakhpur, Azamgarh, Sultanpur and Faizabad districts. The district is divided into five tehsils namely Bhati, Akbarpur, Tanda, Alapur and Jalalpur and nine blocks namely Bhati, Katehri, Tanda, Jalalpur, Ramnagar, Jahangirganj, Akbarpur, Bhiaon and Baskhari. As the district is a part of great Ganges plain, it has almost a featureless alluvial plain with gentle slope. Soil is the prime resource of the people in the study area as it is inhabited mostly by agrarian population. The soil of the area is primarily recent or old alluvial forming the fertile agricultural land.

III. OBJECTIVES

1. To identify the spatio-temporal sprawl in land put to non agricultural use.
2. To investigate the environmental concerns due to sprawl in land put to non agricultural uses.
3. To formulate environmental management for the development of the region.

IV. DATABASE AND METHODOLOGY

Present study is based on secondary data which have been obtained from both online and offline sources such as District Statistical Office, Ambedkar Nagar District, District Census Handbook and Government Online Sources. Simple statistical tools and qualitative and quantitative techniques have been used for the analysis of the data. Mapping and cartographic techniques have also been used to depict the results clearly.

V. FINDINGS AND DISCUSSION

Non agricultural land category is of very importance because all the habitation, institutions, industries, secondary and tertiary economic activities comes under this land category. Land can be called non agricultural land, if any activity in the nature of development is carried over on the land which makes land unfit for cultivation. As far as the district is concerned the second largest landmass after agricultural land comes under this category. The table 1 shows continuous increase of non agricultural land. In 1995 the non agricultural land was just 14.96% which was increased to 15.23% in 2001, 15.34% in 2005 and 17.42% in 2012. The Tanda block which had lowest net sown area had highest non agricultural land. In 1995 Tanda block had 24.18% non agricultural land followed by Baskhari 20.49%, Ramnagar (16.62%), Jahangirganj (16.40%), Bhiaon (13.07%), Bhiti (11.63%), Jalalpur (11.30%), Akbarpur (11.21%), and Katehri (10.62%). In 2001 increase in non agricultural land is recorded in each block. In this year Tanda block had highest land percentage (24.43%) in this category on one hand and on the other hand Katehri had lowest (10.95%) land percentage. In 2005 Tanda was a slight decreased to 24.37% and Katehri was increased to 11.22%. In 2012 Tanda once again with a high increase reached to 27.37% followed by Baskhari (23.47%), Jahangirganj (19.33%), Ramnagar (18.91%), Bhiaon (14.87%), Jalalpur (14.85%), Bhiti (13.71%), Akbarpur (13.37%) and Katehri with decrease (10.77%). In fact the area under non agricultural land represents the so called progress of economic activities in any region where man captures the agricultural, pastures or land of groves and gardens for physical construction work and most of the time disturbing the local ecosystem.

Table 1 shows that within the year 2005-2012 very high increase was recorded under land put to non agricultural use category in each block except Katehri which recorded decrease. The change within 1995-2001 and 2001-2005 was not as remarkable as in the year within 2005-2012. Here pressure of population for their economic activities is clearly visible. The economic development programme and their implementation as well as increase in population require more and more land under this category.

It is evident from the table 2 and figure 2 that very high hectareage change in six blocks (Bhiti, Tanda, Baskhari, Ramnagar, Jahangirganj and Jalalpur) of the district under land put to non agricultural use is reflected within the year 2005-12. The developmental projects and other constructional works are in full swing in recently as well as the construction of houses along road side in the agricultural land is also increasing whereas the Katehri block reflects negative change due to expansion of agricultural land. Though such incidents are rare in the region but appreciable as for as the protection of the environment is concerned. The general view of hectareage change in land put to non agricultural uses reflects the intensity of change very high in recent times as compared to earlier times.

Table 1 Block Wise Change Under Land Put to Non Agriculture Use, Ambedkar Nagar District (1995-2012)

Blocks	Land Put to Non Agricultural Use (in %) Out of Total Area				Hectareage Change under Land Put to Non Agricultural Use		
	1995	2001	2005	2012	1995-2001	2001-2005	2005-2012
Bhiti	11.63	11.97	12.00	13.71	-1	6	356
Katehari	10.62	10.95	11.22	10.77	18	69	-120
Akbar Pur	11.21	11.34	11.27	13.37	23	17	196
Tanda	24.18	24.43	24.37	27.37	-3	-58	947
Baskhari	20.49	20.73	20.89	23.42	-3	-76	534
Ram Nagar	16.62	16.30	16.58	18.91	92	43	544
Jahangir Ganj	16.40	16.59	16.31	19.33	206	-50	667
Jalalpur	11.30	11.80	11.92	14.85	59	34	866
Bhiaon	13.07	13.11	13.80	14.87	-52	146	216
Total District	14.96	15.23	15.34	17.42	417	253	4924

Source: Based on data obtained from district statistical magazine, Ambedkar Nagar district, (1995-2012)

Table 2 Intensity of Hectarage Change Under Non Agricultural Land, Ambedkar Nagar District, 1995-2012

Change	Range	Intensity	Name of Blocks		
			1995-2001	2001-2005	2005-2012
Increase (+)	>300	Very High	Nil	Nil	Bhiti, Tanda, Baskhari, Ramnagar, Jahangirganj, Jalalpur,
	200-300	High	Jahangirganj	Nil	Bhiaon
	100-200	Medium	Nil	Bhiaon	Akbarpur
	<100	Low	Katehri, Akbarpur, Ramnagar, Jalalpur	Bhiti, Katehri, Akbarpur, Ramnagar, Jalalpur	Nil
Decrease (-)	>150	Very High	Nil	Nil	Nil
	100-150	High	Nil	Nil	Katehri
	50-100	Medium	Bhiaon	Tanda, Baskhari	Nil
	<50	Low	Bhiti, Tanda, Baskhari	Jahangirganj	Nil

Source: Based on data obtained from district statistical magazine, Ambedkar Nagar district, (1995-2012)

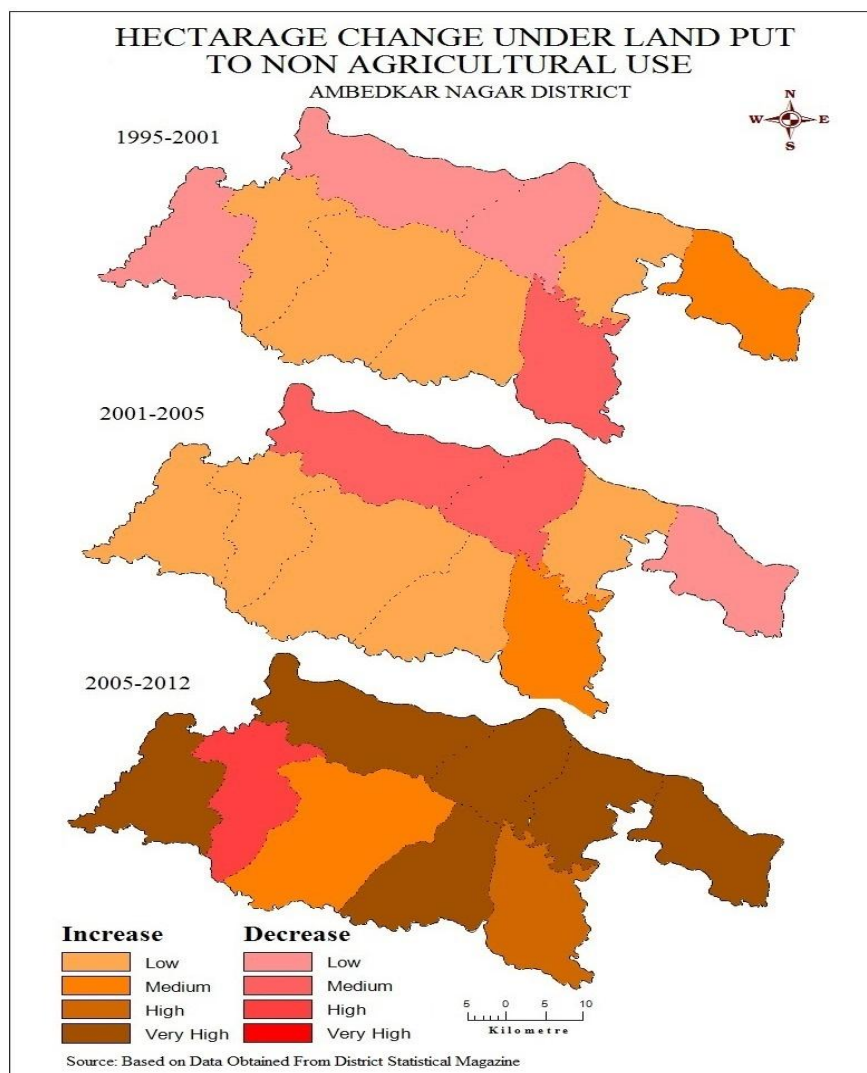


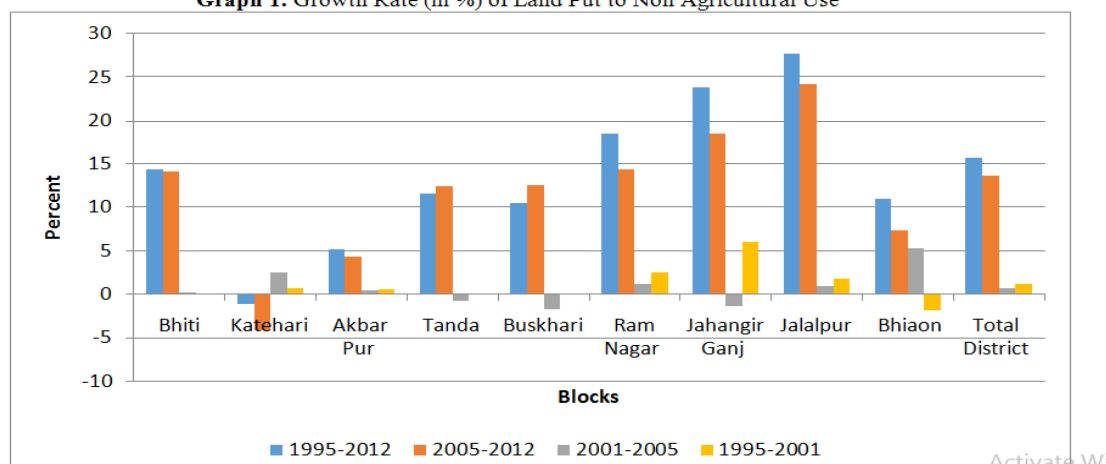
Fig. 2

Table 3 Growth Rates (in %) of Different land Use Categories (1995-2012)

Blocks	Agricultural Land	Forest	Barren Cultivated Waste	Present Fallow Land	Other Fallow Land	Barren and Uncultivated Land	Land Put to Non Agricultural Land	Pastures	Area Under Bush, Groves & Garden
Bhiti	-0.53	-63.16	-1.73	7.61	-50.62	-7.89	14.37	-6.90	-49.34
Katehari	6.38	-86.61	-30.49	-4.24	-73.82	-35.06	-1.20	-34.73	-50.00
Akbar Pur	-15.29	-34.38	-10.88	104.65	-87.65	-24.04	5.19	2.70	-55.98
. Tanda	-2.57	-41.40	-1.10	479.77	-54.98	-7.26	11.53	-5.56	-15.11
Buskhadi	0.97	-58.62	-46.14	-72.25	67.95	-17.46	10.46	-33.33	-78.96
Ram Nagar	9.37	144.44	-29.48	-62.15	18.50	-3.16	18.62	-6.12	-82.12
Jahangir Ganj	6.62	0.00	-9.38	-30.22	21.00	0.34	23.98	-7.14	-67.06
Jalalpur	1.31	31.58	7.86	-75.57	-22.75	14.53	27.66	78.13	-44.93
Bhiao	4.14	166.67	-14.63	-80.92	36.27	27.63	10.95	35.29	-90.63
Total District	2.22	-42.66	-13.64	-17.84	-37.03	-6.37	15.74	-8.99	-48.73

Source: Based on data obtained from district statistical magazine, Ambedkar Nagar district, (1995-2012)

Graph 1. Growth Rate (in %) of Land Put to Non Agricultural Use



Ambedkar Nagar district is an area with limited natural resources but having the tendency of rapid increasing population. As per the ‘Census of India 2011’ Ambedkar Nagar District possess a total population of 2,397.88 thousand persons and having a growth rate of 18.35% between 2001-2011. Agriculture is the primary resource in the region for achieving food security. The sprawl of land put to non agricultural use is as usual the result of increasing population. With increasing population, the demand of land for housing and other human needs also increases day by day. The big positive change that has been observed is in the quantum of land put to non agricultural uses since the formation of the district. Setting up of medium and small scale industries, shops, habitations, government offices, transportation network have been accelerated between 2005-2012 reflected in the accelerated growth rate of land put to non agricultural use much more than the other categories (Graph 1). Meanwhile the area under barren uncultivated land, pastures, forests and area under groves and gardens significantly revealed negative growth rate (Table 3) which resulted into imbalance of local ecosystem. The area under pastures, groves, gardens, forests are the natural filters of contaminants produced by mankind and share an important and integral part in the region. When we see sprawl in land put to non agricultural uses it results into not only the shrinking of other areas but also reduction of natural filters. Land consumption due to residential development, economic growth and transportation belongs to the most serious environmental pressures on landscapes worldwide, in particular in urbanized areas. Accordingly, the aim of containing the development of land is rated increasingly high on the agenda of environmental policy [20]. Humanity is increasingly urban, but continues to depend on Nature for its survival [21] so if the mankind is continuously involved in disturbing natural ecosystem as seen in the area, there is a question mark for his sustainability.

VI. MANAGEMENT STRATEGIES

Due to increase in population the area under non agricultural land is increasing drastically. The environmental effect can be minimized in the region using following strategies-

- The region is a newly constructed district and it needs land for construction of buildings for administration and other activities. Often governments acquire agricultural lands for their offices due to ease of access to the market or town area that reduces agricultural land. To minimize the effect major developmental projects should not be passed on agricultural land if not extremely important.
- Government should make a guideline to use vertical space in building construction to mitigate horizontal expansion. This will save more land which can be used for other purposes.
- Roads share an important part under land put to non agricultural uses, it also provide great scope for linear tree plantation on both sides of the road that could compensate the deforestation or cutting of trees for construction works and is also capable to minimize the effects of environmental degradation, so it is needed to be developed a green strip on both sides of road.
- Farmers often find better income prospect by selling their lands along roadside for construction of buildings or they themselves are constructing buildings for shops, stores or renting etc. rather the income in poor agriculture. To mitigate this challenge on one hand farmers are needed to be motivated to practice agriculture in agricultural land and needs to be helped financially by government and NGOs if required and on the other hand a strict law in needed for those who construct houses or buildings on agricultural land and should be fined heavily. This will demoralize the encroachers of agricultural land that will be beneficial for environment and society.
- All the industrial development should be environment friendly. The government should give his priority on controlling environmental hazards due to industrial output.
- As far as possible barren and uncultivated land should be used in the construction work.

VII. CONCLUSION

The area under study is basically an agricultural area where land plays an important role in economic development through agriculture but since last two decades the sprawl in land put to non agricultural uses presenting threat to not only agricultural land but also to the other important land use categories. Though it is obvious that increasing population needs more land for their economic activities but it should not be at the cost of our environment. There should be an ideal expansion mechanism as proposed in the management strategies. No doubt we need development but not at the cost of environmental degradation or disturbed phisico-cultural structure of land. 'Prevention is better than cure' an often cited phrase is truly representing the theme of the article as the problem of sprawl of land put to non agricultural uses is at initial stage in the region that could be managed easily if awakened.

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