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Land Use Pattern Analysis And Its Effects On Agricultural Growth In District Basti (UP)

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Abstract:- Land use pattern is a key indicator of how natural resources are utilized and managed in any region, especially in agriculturally dominated districts like Basti in eastern Uttar Pradesh. Agriculture is the main source of livelihood for the majority of the population in this district, making the study of land utilization and agricultural factors extremely important. The present study examines the existing land use pattern in District Basti and analysis the major physical, socio-economic, and institutional factors influencing agricultural activities and growth.The study highlights the distribution of land under various categories such as net sown area, fallow land, forest land, barren land, and land put to non-agricultural uses. It has been observed that a large proportion of land is devoted to agriculture; however, increasing population pressure, fragmentation of landholdings, and expansion of non-agricultural activities have reduced the efficiency of land use. Fertile alluvial soil and favourable climatic conditions provide strong natural support for agriculture, yet agricultural productivity remains moderate due to limited irrigation facilities, dependence on monsoon rainfall, and traditional farming practices.

Socio-economic factors such as small and marginal landholdings, poverty, lack of access to modern technology, and inadequate market infrastructure significantly affect agricultural performance in the district. Institutional challenges, including insufficient extension services and limited awareness among farmers, further restrict the adoption of improved agricultural methods. The study is based on secondary data collected from census reports, district statistical handbooks, and agricultural records.

The findings suggest that although District Basti has considerable agricultural potential, inefficient land use and multiple constraints hinder sustainable agricultural growth. The study emphasizes the need for scientific land use planning, improved irrigation facilities, land consolidation, and farmer-oriented development programs to enhance agricultural productivity and ensure long-term rural development in the district.

Key Words:- Land Use Pattern, Agricultural Growth, Cropping Pattern, Irrigation

Introduction:-

Land use pattern is a dynamic expression of the relationship between human society and the physical environment. In geographical studies, land use is not merely viewed as the allocation of land to different purposes, but as an outcome of complex interactions among physical factors such as soil, climate, and relief, and human factors including population pressure, technology, socio-economic conditions, and institutional frameworks. Theoretical perspectives in agricultural geography emphasize that the pattern of land utilization directly influences agricultural productivity, sustainability, and regional development. Classical land use theories, such as von Thünen's agricultural location theory, highlight the role of accessibility, market forces, and economic rationality in shaping land use. In developing agrarian regions, however, land use patterns are more strongly influenced by demographic pressure, traditional practices, and institutional constraints rather than purely economic optimization. In India, where agriculture remains the backbone of rural livelihoods, land use patterns reflect historical land tenure systems, subsistence-oriented farming, and uneven technological diffusion. Consequently, agricultural growth often varies significantly across regions despite similar physical conditions.

Uttar Pradesh, one of India's major agricultural states, presents a diverse picture of land utilization and agricultural development. The eastern part of the state, including District Basti, is characterized by high population density, small and fragmented landholdings, and a predominance of subsistence agriculture. Although the district lies within the fertile alluvial plains of the Ganga basin and enjoys favourable climatic conditions, agricultural growth has remained relatively slow. This contradiction between natural potential and actual agricultural performance necessitates a systematic analysis of land use pattern and the factors affecting agriculture.From a theoretical standpoint, land fragmentation resulting from population growth and inheritance laws reduces operational efficiency and limits the adoption of modern agricultural technologies. According to Boserup's theory of agricultural intensification, population pressure can lead to intensified land use; however, in regions like Basti, the lack of capital, irrigation infrastructure, and institutional support often prevents such positive transformation. As a result, land use becomes increasingly stressed, leading to declining soil fertility, expansion of fallow land, and overdependence on monoculture cropping systems.

Physical factors such as soil quality, rainfall variability, and water availability form the natural base of agriculture, but their impact is mediated by human decision-making and policy interventions. In District Basti, agriculture is largely monsoon-dependent, reflecting a low level of irrigation development. Socio-economic variables such as poverty, marginal landholdings, limited access to credit, and weak market linkages further constrain agricultural growth. Institutional factors, including inadequate extension services and slow technological diffusion, also play a critical role in shaping land use outcomes.

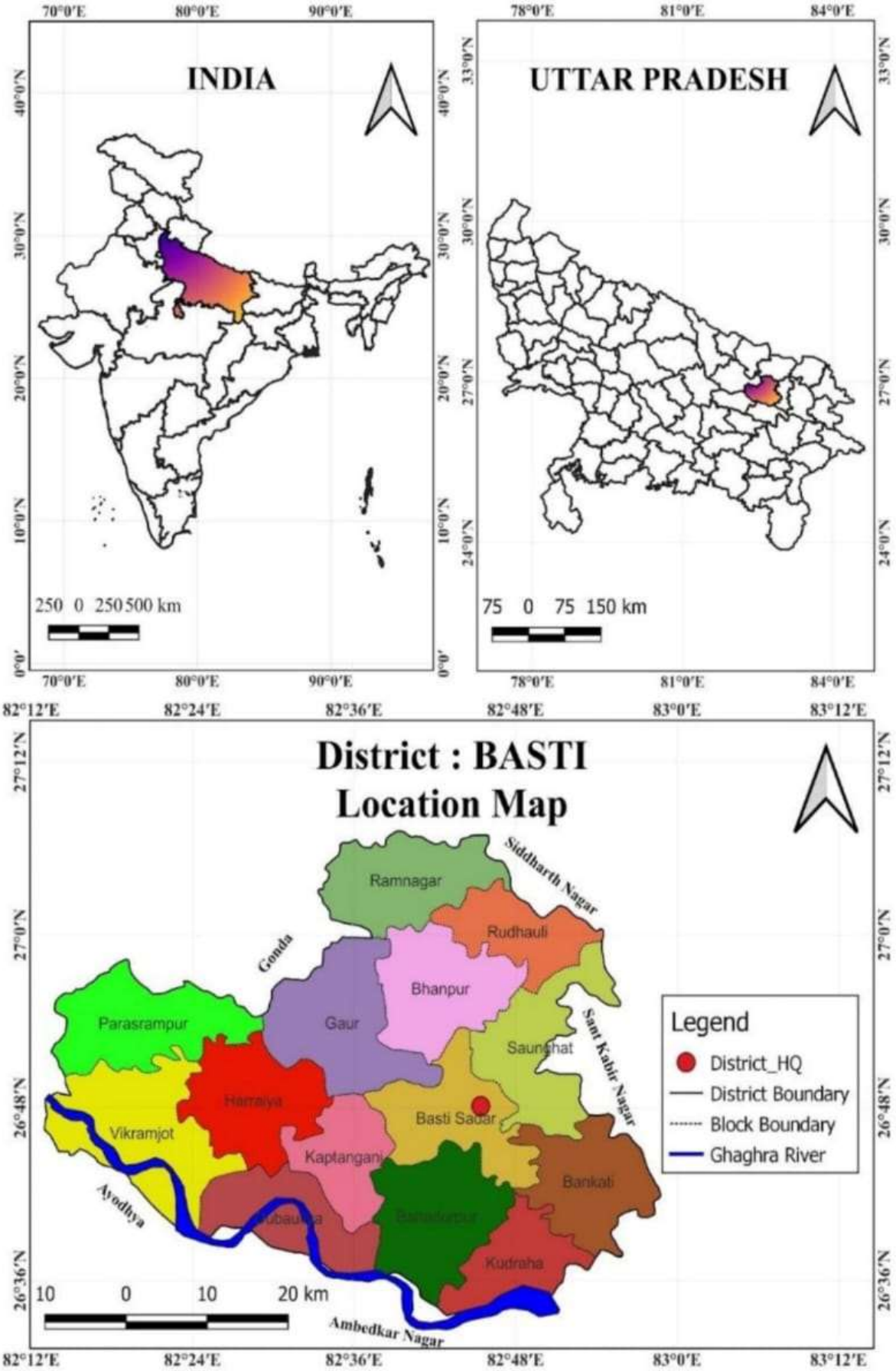
The theoretical framework of sustainable land use emphasizes the need for balanced utilization of land resources to ensure long-term agricultural productivity and environmental stability. Understanding the spatial distribution of land use categories and the underlying factors affecting agriculture is essential for planning sustainable rural development. Therefore, the present study seeks to analyse the land use pattern of District Basti and examine the physical, socio-economic, and institutional factors influencing agriculture.

Such an analysis contributes to a broader geographical understanding of regional agricultural disparities and provides a foundation for effective land use planning and policy formulation.

Nature of Research Problem:-

Despite favourable physical conditions such as fertile alluvial soil and adequate rainfall, agricultural growth in District Basti remains limited. The core problem lies in inefficient land use patterns characterized by fragmented landholdings, increasing fallow and wastelands, and growing conversion of agricultural land to non-agricultural uses. Agriculture is largely dependent on monsoon rainfall due to inadequate irrigation facilities, making it vulnerable to climatic variability. Socio-economic constraints such as poverty, small landholdings, limited technological adoption, and weak institutional support further restrict agricultural productivity and sustainability in the district.

Study Area: District Basti (UP) :- The district is situated in the north – eastern part of Uttar Pradesh. It forms part of the stretch of country lying beyond the river Ghagra in the northeast corner of Uttar Pradesh. The district lies between the parallels of **26° 23′** and **27° 30′** North latitude and **82° 17′** and **83° 20′** East longitude. It comprises a tract of somewhat irregular shape. The district is surrounded by Sant Kabir Nagar on the east and Gonda on the west, on the south. Ghaghara river separates it from Faizabad and Ambedker Nagar while on the north the boundary marches with Sidharth Nagar district. Its area is **2,688.00** Sq.km.


INDIA
250 0 250 500 km
UTTAR PRADESH
75 0 75 150 km
District : BASTI
Location Map
Ramnagar
Siddharth Nagar
Rudhauli
Gonda
Bhanpur
Parasrampur
Gaur
Saunghat
Sant Kabir Nagar
Harraiya
Basti Sadar
Vikramjot
Kaptanganj
Bankati
Ayodhya
Kudraha
Ambedkar Nagar
Legend
District_HQ
District Boundary
Block Boundary
Ghaghra River
10 0 10 20 km

Objectives of the Study:- The main objectives of the present research study are:

1 - To analyse the existing land use pattern in District Basti.

2 -To study the cropping pattern and agricultural practices prevalent in the district.

3 - To examine the physical and socio- economic factors affecting agriculture.

4 - To assess the impact of land use patterns on agricultural growth.

5 - To suggest measures for sustainable land use and agricultural development.

Importance or Significance :-

1 - Helps in understanding the spatial distribution of land use categories in District Basti and their relationship with agricultural performance.

2 - Provides insight into how physical factors such as soil, climate, and water availability influence agricultural land utilization.

3 - Highlights the role of socio-economic factors including population pressure, land fragmentation, poverty, and technological limitations in shaping agricultural outcomes.

4 - Contributes to the theoretical understanding of human–environment interaction, particularly in agrarian regions of eastern Uttar Pradesh.

5 - Assists in identifying major constraints to agricultural growth, such as inadequate irrigation, traditional farming practices, and inefficient land management.

6 - Offers a regional case study that can be useful for comparative geographical studies of land use and agriculture in similar districts.

7 - Supports sustainable land use planning by identifying areas of underutilization, fallow land, and cultivable wasteland.

8 - Provides a scientific basis for policy formulation and rural development planning at the district and state levels.

9 - Helps planners and administrators in designing farmer-oriented development programs focused on land consolidation, irrigation expansion, and crop diversification.

10 - Enhances academic understanding for students, researchers, and educators of geography and rural development.

11 - Contributes to achieving broader goals of sustainable agriculture, food security, and rural livelihood improvement.

12 - Serves as a reference for future research on agricultural development, land use change, and regional planning in Uttar Pradesh.

Research Methodology:-

The present study adopts a descriptive and analytical research methodology to examine the land use pattern and factors affecting agriculture in District Basti, Uttar Pradesh. The methodology is designed to understand both the spatial distribution of land use categories and the underlying physical, socio-economic, and institutional factors influencing agricultural development.

The study is primarily based on secondary data analysis, as it allows a comprehensive examination of long-term trends and regional patterns. The district has been selected as the unit of analysis because of its agrarian

nature and its representative characteristics of eastern Uttar Pradesh. To ensure clarity and reliability, data have been analysed at the district level, and wherever required, block-level variations have been considered. For the analysis of land use patterns, land has been classified into standard categories such as net sown area, current fallow land, other fallow land, forest land, barren and uncultivable land, land under non-agricultural uses, and cultivable waste land. Simple statistical tools such as percentages, ratios, and comparative analysis have been used to interpret the data. Changes and variations in land use have been examined to understand their impact on agricultural growth.

The study also incorporates a factor-based analytical approach to assess the influence of physical factors (soil, climate, rainfall, and water resources) and human factors (population pressure, landholding size, irrigation facilities, technological adoption, and socio-economic conditions). The relationship between land use pattern and agricultural productivity has been explained through qualitative interpretation supported by quantitative data.

Maps, tables, and diagrams have been used wherever necessary to present the data in a clear and systematic manner. The findings have been interpreted in the light of established geographical theories related to land use, agricultural development, and human–environment interaction, thereby providing a strong theoretical foundation to the study.

Data Sources:-

The study is based entirely on secondary sources of data, collected from reliable and authentic government publications and academic sources. The major data sources include:

- District Statistical Handbook, Basti
- Census of India Reports (Primary Census Abstract and related tables)
- Agricultural Statistics of Uttar Pradesh, published by the State Government
- Reports of the Department of Agriculture, Government of Uttar Pradesh
- Land Use Statistics published by the Directorate of Economics and Statistics
- Books and research journals related to agricultural geography and land use studies
- Reports and publications of planning and development agencies

These sources provide comprehensive information on land use classification, cropping pattern, irrigation facilities, population characteristics, and agricultural trends. The use of multiple data sources enhances the reliability and validity of the study.

Land Use Pattern in District Basti (Uttar Pradesh):-

The land use pattern of District Basti reflects its predominantly agrarian character and traditional rural economy. Located in the fertile alluvial plains of eastern Uttar Pradesh, the district has favourable natural conditions for agriculture. As a result, a major proportion of the total geographical area is devoted to agricultural activities. However, variations in land utilization also indicate the influence of population pressure, socio-economic conditions, and changing development needs.

Net Sown Area:-

Net sown area constitutes the largest share of land use in District Basti. The dominance of agriculture is evident from the extensive cultivation of food crops such as rice, wheat, pulses, and sugarcane. Fertile

alluvial soils and relatively flat terrain support cultivation across most parts of the district. However, the net sown area is characterized by small and fragmented landholdings, which reduce agricultural efficiency and limit mechanization. Multiple cropping is practiced in irrigated areas, while single cropping dominates rain-fed regions.

Fallow Land:-

A noticeable portion of land in Basti remains under current fallow and other fallow categories. This is mainly due to irregular rainfall, lack of assured irrigation facilities, declining soil fertility, and financial constraints of farmers. In some areas, land is left fallow to restore soil fertility, while in others it reflects the inability of farmers to invest in inputs. The presence of fallow land directly affects agricultural output and indicates underutilization of land resources.

Forest Land:-

Forest cover in District Basti is very limited. Over time, most forested areas have been cleared to expand agricultural land and human settlements. The low proportion of forest land has ecological consequences, such as reduced biodiversity and increased vulnerability to soil erosion. The absence of adequate forest cover also affects the sustainability of agricultural practices in the long run.

Land under Non-Agricultural Uses:-

Land under non-agricultural uses has gradually increased due to population growth, urban expansion, and infrastructure development. This category includes land used for settlements, roads, educational institutions, markets, and other developmental activities. Although such development is necessary, it has reduced the availability of cultivable land and increased pressure on existing agricultural areas.

Barren and Cultivable Waste Land:-

Some areas in the district fall under barren, uncultivable, and cultivable waste land categories. These lands are often affected by waterlogging, poor drainage, soil salinity, or lack of proper land management. With appropriate reclamation measures, irrigation facilities, and soil improvement techniques, a part of this land can be brought under cultivation.

Overall, the land use pattern of District Basti shows a strong dominance of agriculture, but also highlights several challenges such as land fragmentation, increasing fallow land, limited forest cover, and expanding non-agricultural uses. Efficient land use planning, reclamation of wastelands, and sustainable agricultural practices are essential for improving agricultural productivity and ensuring long-term rural development in the district.

Land Use Pattern of The District Basti

Land Use Pattern of The District	Geographical Area	Cultivable Area	Forrest Area	Land Under Non Agricultural Use	Permanent Pastures	Cultivable Wasteland	Land Under Misc. Tree Crops and Groves	Barren and Uncultivable Land	Current Fallows Land	Other Fallows Land
Area in, 000 Ha	377.0	228.1	4.4	40.3	0.5	4.1	6.4	3.8	5.6	3.1

Source:

https://www.icar-crida.res.in/CP/Uttar_Pradesh/UP44-Basti 26.07.14.pdf

Agricultural Land Uses

Agricultural Land Use	Area (000Ha)	Cropping Intensity (%)
Net Sown Area	208.9	125.9
Area Sown More Than Once	78.1	
Gross Cropped Area	287.0	

Source:

https://www.icar-crida.res.in/CP/Uttar_Pradesh/UP44-Basti-26.07.14.pdf

Cropping Pattern and Agricultural Practices in District Basti (Uttar Pradesh):-

The cropping pattern of District Basti reflects the dominance of traditional agriculture influenced by natural conditions, irrigation availability, and socio-economic factors. Agriculture in the district is primarily subsistence-oriented, with food grains occupying the largest share of the cultivated area. Seasonal variations, dependence on monsoon rainfall, and limited technological adoption play a significant role in shaping cropping choices and farming practices.

Cropping Pattern:-

The cropping pattern in District Basti is mainly divided into kharif, rabi, and zaid seasons.

Kharif Crops:- Rice is the principal kharif crop and occupies the largest area under cultivation. It is widely grown due to suitable rainfall and clayey-loam soils. Other kharif crops include maize, pulses, and oilseeds. Rice cultivation is largely dependent on monsoon rainfall, making production vulnerable to irregular precipitation.

Rabi Crops:- Wheat is the most important rabi crop in the district and forms the backbone of food security. It is followed by gram, pea, mustard, and barley. Rabi cropping is more productive in areas with better irrigation facilities, particularly where tube wells are available.

Zaid Crops:- Zaid crops such as vegetables, watermelon, and fodder crops are grown on a limited scale, mainly in irrigated areas. The short duration of this season and water scarcity restrict its expansion.

Cash Crops:- Sugarcane is the most significant cash crop of the district and plays an important role in the rural economy. It requires assured irrigation and longer growing periods, which limits its cultivation to specific areas.

Overall, the cropping pattern is characterized by dominance of food grains, limited diversification, and low commercial orientation.

Major Field Crops Cultivated

Major field crops cultivated	Area('000 ha)							
	Kharif			Rabi			Summer	Total
	Irrigated	Rain fed	Total	Irrigated	Rain fed	Total		
Rice	38.6	66.1	104.7	-	-	-	-	104.7
Wheat	-	-	-	117.5	0	117.5	-	117.5
Pea	-	-	-	4.3	0.1	4.4	-	4.4
Redgram	0	3.0	3.0	-	-	-	-	3.0
Sugarcane	37.3	1.0	38.3	-	-	-	-	38.3
Rapeseed Mustard	-	-	-	2.4	0	2.4	-	2.4

Source:

https://www.icar-crida.res.in/CP/Uttar_Pradesh/UP44-Basti-26.07.14.pdf

Agricultural Practices:-

■ Agricultural practices in District Basti are largely traditional in nature. Most farmers rely on conventional tools and methods due to small landholdings and limited financial resources.

■ The use of high-yielding variety (HYV) seeds, chemical fertilizers, and pesticides is uneven and relatively low compared to developed agricultural regions.

■ Irrigation facilities are inadequate, resulting in heavy dependence on monsoon rainfall, especially for kharif crops.

■ Mechanization is limited, with tractors and modern equipment mostly confined to large farmers.

■ Mixed cropping and crop rotation are practiced to some extent, mainly to maintain soil fertility and reduce risk.

Factors Affecting Agriculture in District Basti (Uttar Pradesh):-

Agriculture in District Basti is influenced by a combination of physical, socio-economic, and institutional factors. Although the district has favorable natural conditions, several constraints limit agricultural productivity and growth. An understanding of these factors is essential for assessing agricultural development and planning sustainable land use.

1. Physical Factors:-

Soil:- District Basti is mainly covered with fertile alluvial soil, which is suitable for the cultivation of food grains and cash crops. However, continuous cultivation without adequate soil management has led to declining soil fertility in some areas. Problems such as waterlogging and nutrient depletion also affect crop yields.

Climate and Rainfall:- The district experiences a sub-tropical monsoon climate with hot summers and moderate to high rainfall. While rainfall generally supports kharif crops, its irregular distribution often causes drought-like or flood conditions, adversely affecting agricultural production.

Water Resources:- Rivers and groundwater resources are available, but their utilization is uneven. Limited irrigation infrastructure makes agriculture highly dependent on monsoon rainfall, increasing uncertainty and risk for farmers.

2. Socio-Economic Factors:-

Population Pressure:- High population density has resulted in fragmentation of landholdings. Small and marginal farmers dominate the agricultural structure, reducing economies of scale and profitability.

Landholding Size:- The prevalence of small and fragmented landholdings restricts mechanization and the adoption of modern farming techniques.

Poverty and Indebtedness:- Financial constraints prevent farmers from investing in improved seeds, fertilizers, irrigation facilities, and machinery.

3. Technological Factors:-

Low Level of Mechanization:- Traditional tools and methods are still widely used, especially by small farmers, resulting in low productivity.

Limited Use of Modern Inputs:- The adoption of high-yielding varieties, fertilizers, and plant protection measures remains inadequate.

4. Institutional and Infrastructure Factors:-

Irrigation Facilities:- Inadequate canal networks and uneven distribution of tube wells limit irrigation coverage.

Agricultural Extension Services:- Lack of awareness and limited access to extension services slow the adoption of improved agricultural practices.

Market and Transport Facilities:- Poor market infrastructure and price instability discourage crop diversification and commercial farming.

Impact of Land Use Pattern on Agricultural Growth:-

● A high proportion of land under cultivation reflects the agrarian nature of the district, but inefficient land management limits productivity.

● Fragmentation of landholdings reduces farm efficiency, restricts mechanization, and increases the cost of cultivation, negatively affecting agricultural growth.

● The presence of fallow and cultivable wastelands lowers the effective cropped area and results in underutilization of available land resources.

● Limited forest cover disturbs ecological balance, leading to soil erosion and reduced soil moisture, which indirectly affects agricultural sustainability.

● Expansion of land under non-agricultural uses such as settlements and infrastructure decreases the availability of cultivable land.

● Uneven distribution of irrigated land influences cropping intensity, with multiple cropping confined to well-irrigated areas.

● Dependence on monsoon rainfall restricts agricultural stability and increases vulnerability to climatic variations.

● Dominance of traditional cropping patterns limits crop diversification and income generation.

● Inefficient land use prevents optimal utilization of fertile alluvial soils, resulting in moderate agricultural growth despite favourable natural conditions.

● Lack of scientific land use planning hinders sustainable agricultural development and long-term productivity.

● Proper land consolidation, reclamation of wastelands, and balanced land allocation can significantly enhance agricultural growth in the district.

Suggestions or Measures to Improve Agricultural Growth:-

☆ Scientific land use planning should be adopted to ensure optimum utilization of agricultural land and prevent unnecessary conversion to non-agricultural uses.

☆ Land consolidation programs must be strengthened to reduce fragmentation of holdings and improve farm efficiency and mechanization.

☆ Expansion and modernization of irrigation facilities, including canals, tube wells, and rainwater harvesting systems, are essential to reduce dependence on monsoon rainfall.

☆ Reclamation of fallow and cultivable wastelands through soil improvement, drainage management, and use of organic manure should be promoted.

☆ Crop diversification should be encouraged to reduce risk and increase farm income, especially through cultivation of pulses, oilseeds, vegetables, and horticultural crops.

☆ Promotion of multiple cropping and higher cropping intensity in irrigated areas can significantly enhance agricultural output.

☆ Adoption of modern agricultural technology, including high-yielding variety seeds, improved fertilizers, and pest management techniques, should be increased.

☆ Strengthening agricultural extension services to improve farmer awareness and training on modern farming practices and sustainable agriculture.

☆ Improvement of rural infrastructure, such as roads, storage facilities, and markets, to reduce post-harvest losses and ensure fair prices for farmers.

☆ Access to institutional credit and subsidies should be improved to help farmers invest in inputs, irrigation, and farm machinery.

☆ Soil conservation and sustainable farming practices must be promoted to maintain long-term soil fertility and environmental balance.

☆ Government support programs and policies should focus on small and marginal farmers to ensure inclusive agricultural development.

Problems and Challenges Related to Land Use Pattern and Agricultural Growth:-

■ Fragmentation of landholdings due to population pressure and inheritance laws has resulted in small and scattered farms, reducing agricultural efficiency and mechanization.

■ Increasing pressure on agricultural land because of population growth has led to the conversion of cultivable land into non-agricultural uses such as settlements and infrastructure.

■ A significant proportion of land under fallow and wasteland reflects inefficient land utilization caused by lack of irrigation, soil degradation, and financial constraints of farmers.

■ Inadequate irrigation facilities make agriculture highly dependent on monsoon rainfall, increasing uncertainty and risk in crop production.

■ Declining soil fertility due to continuous cultivation, improper use of fertilizers, and lack of soil conservation practices adversely affects crop yields.

■ Limited forest cover has disturbed ecological balance, resulting in soil erosion, reduced moisture retention, and environmental stress on agricultural land.

■ Traditional farming practices and low technological adoption restrict productivity and prevent modernization of agriculture.

■ Poor rural infrastructure, including inadequate roads, storage facilities, and markets, leads to post-harvest losses and low farm income.

■ Lack of crop diversification and overdependence on a few food crops increase vulnerability to climatic fluctuations and market instability.

■ Financial constraints and indebtedness of farmers limit investment in modern inputs, irrigation, and farm machinery.

■ Weak agricultural extension services and limited awareness among farmers slow the adoption of improved and sustainable farming practices.

■ Absence of scientific land use planning results in unbalanced land allocation and long-term sustainability issues.

Conclusion:-

The present study of land use pattern and agricultural growth in District Basti, Uttar Pradesh, highlights the close relationship between land utilization and the level of agricultural development. The district is predominantly agrarian, with a large proportion of land under cultivation, supported by fertile alluvial soils and favourable climatic conditions. Despite these natural advantages, agricultural growth in the district remains moderate due to several structural and institutional constraints. The existing land use pattern is characterized by fragmented landholdings, limited forest cover, increasing land under non-agricultural uses, and the presence of fallow and wastelands. These features have directly affected agricultural productivity and cropping intensity. Fragmentation of land has reduced operational efficiency and discouraged mechanization, while inadequate irrigation facilities have made agriculture heavily dependent on monsoon rainfall. As a result, cropping remains largely traditional and risk-prone, particularly in rain-fed areas.

The study also reveals that socio-economic factors such as population pressure, poverty, limited access to credit, and poor market infrastructure play a crucial role in shaping agricultural outcomes. Technological

constraints and weak extension services further restrict the adoption of modern and sustainable agricultural practices. Although some areas with better irrigation facilities show higher cropping intensity, the overall potential of the district remains underutilized. To achieve sustainable agricultural growth in District Basti, scientific land use planning is essential. Measures such as land consolidation, expansion of irrigation facilities, reclamation of wastelands, crop diversification, and strengthening of agricultural institutions can significantly improve productivity and farmer income. A balanced and integrated approach to land management, combined with technological and policy support, is necessary to ensure long-term agricultural development and rural prosperity in the district.

In conclusion, efficient land use and targeted agricultural interventions can transform District Basti's agrarian economy and contribute to sustainable regional development.

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