Land Use Land Cover Change of Mymensingh District

and Lessons Learned

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Key Findings

- **Annually, around 2% of water bodies in Mymensingh are diminishing. Over the past 34 years, this has resulted in a cumulative reduction of 52%. If the water sources and fellow lands are lost at the current rate there will be no more water sources in the next 35 years, and no more vacant land after the next 8-10 years.**
- Crop Land Expansion (+35.40%): Significant increase suggests intensified agricultural use, possibly due to demand for food security and economic gains. It might further propose the conversion of existing wetlands and untouched regions into agriculture.
- Accelerated growth of settlements (+122.37%): Reflects urbanization and population growth. Could lead to greater stress on nearby agricultural and natural landscapes.
- Decline in Homestead Vegetation (−18.67%): Indicates loss of traditional agroforestry and rural greenery. Impact on species diversity and microclimatic factors.
- Major Reduction of Barren Land (−83.83%): Embodies an extensive use of hitherto unused land, which can bring economic gains but may limit land availability for nature restoration or biodiversity preservation.
- Decline in Waterbodies (−51.92%): A concerning trend, likely caused by encroachment, siltation, or climate-driven hydrological changes. Impacting fishery populations, aquifer replenishment, and ecosystem balance

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Mymensingh District of Bangladesh-comprised of a wide variety of natural resources, which are crucial for maintaining its economic infrastructure and ecosystem diversity. The District's natural resources, consisting of its valuable agricultural fields, forest ranges, and abundant water bodies, are of immense importance for propelling economic development while ensuring environmental balance. Sustainable management measures lie at hand for establishing long-term prosperity as well as for ensuring overall well-being of the environment here.

- Farm Practices and Natural Resources: The district's terrain is shaped by historical courses of the Brahmaputra River, resulting in rich alluvial soils that are highly conducive to agriculture. - The region is a prominent producer of rice, jute, wheat, and various vegetables, forming a substantial part of its agrarian economy.

- Forests and Biodiversity: Under the Madhupur Tract elevated forest tract is notable for its sal (Shorea robusta) trees, which are valuable for timber production and play a major role in carbon sequestration. Kadigarh National Park, located in Bhaluka Upazila, this 344.13-hectare park serves as a protected area for diverse flora and fauna, contributing to conservation efforts in the region.

- Aquatic Resources and Fisheries Management: The district is traversed by several rivers, including the Old Brahmaputra, Kangsha, and Narsunda, which support irrigation, transportation, and fisheries. Moreover, studies have identified a rich diversity of fish species in the Old Brahmaputra River, with 13 species classified as abundant, highlighting the river's ecological significance.

- Dependence on Groundwater: The district relies heavily on groundwater for agricultural and domestic use. However, excessive withdrawal has led to concerns over sustainability and declining water tables.

- Opportunities for aquaculture will: Efforts have been made to promote prawn (Macrobrachium rosenbergii) farming in the region. Despite developmental projects, challenges remain in achieving sustainable aquaculture practices.

However, Change Initiative study on April 2025 have delves into the shifting landscape of Mymensingh District over the past 34 years, capturing the changes in land use and land cover (LULC) from 1990 to 2024. The data paints a compelling picture of the region's evolving environment, highlighting significant transformations across various land categories. Let's break down the key findings:

Table 1: Land Use Area Calculation (IN sq.km)

Land Use Category	In Sq. Km.		Changes (%)	Increased/ Decreased
	1990	**2024**		
Fellow Land	245.6	39.71	-83.83	Decreased
Homestead Vegetation with Rural Settlement	1086.02	883.25	-18.67	Decreased
Settlement	23.56	52.39	122.37	Increased
Crop Land	2205.48	2986.2	35.40	Increased
Waterbody	772.12	371.27	-51.92	Decreased

Source: Change Initiative analysis, 20th April 2025

Waterbody Loss: In 1990, Mymensingh's waterbodies spanned an area of 772.12 km^2. Fast-forward to 2024, and this has been reduced to just 371.27 km^2, a sharp 52% decline (400.85 km^2). This considerable reduction in waterbodies raises an alarming environmental concern. The maps show a clear shrinkage of these blue areas, signaling potential risks to the ecosystem, such as loss of aquatic habitats and water resources.

Homestead Vegetation with Rural Settlements: In contrast to the decrease in waterbodies, the land area covered by homestead vegetation combined with rural settlements has seen a decrease. In 1990, it occupied 1086.02 km^2, but by 2024, it reduced to 883.25 km^2.

Decline of Fellow Land: Fellow land, which stood at 245.60 km^2 in 1990, has seen a dramatic drop, now covering just 39.71 km^2 in 2024. This decrease of over 80% suggests that large portions of this land have been repurposed for urban expansion or agricultural development. The map visually illustrates how these green areas have shrunk over the years, reflecting this significant land-use conversion.
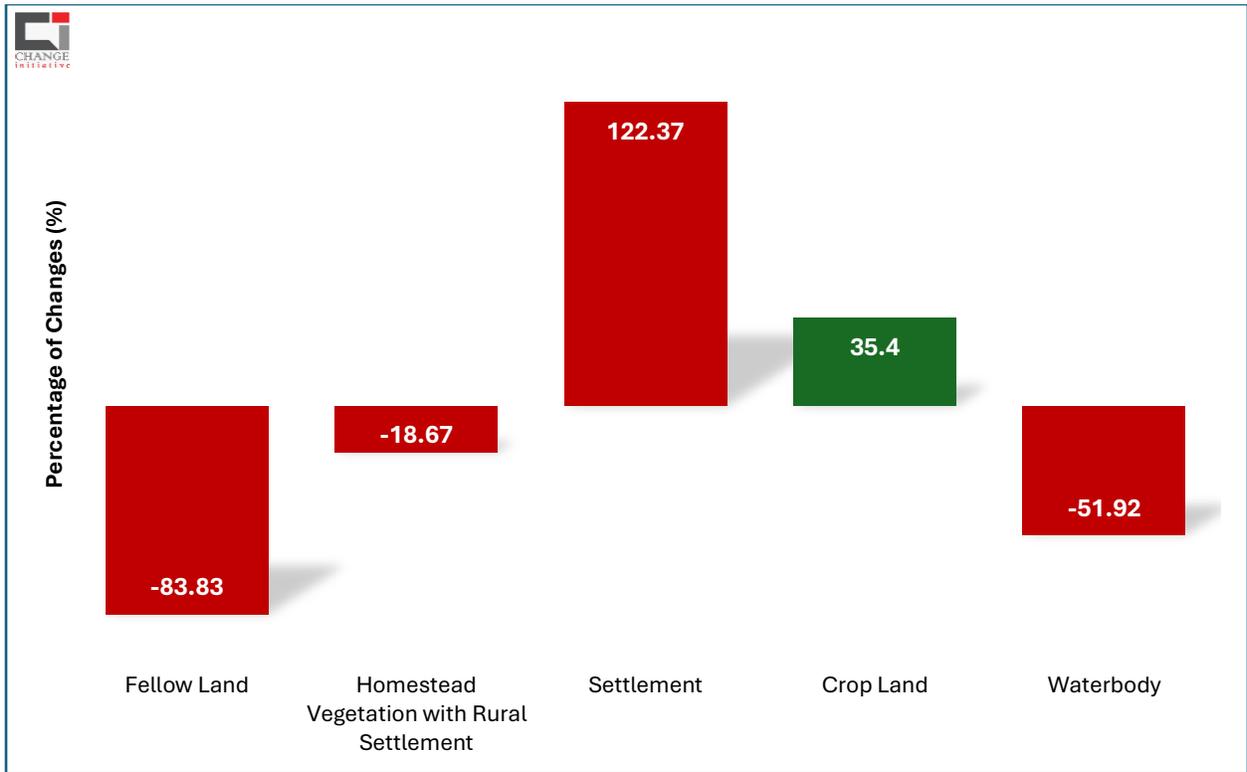
Figure 1: LULC Changes of Mymensingh District (1990-2024)

Source: Change Initiative Analysis, April 2025

Growth of Crop Land: Agriculture appears to be expanding in Mymensingh. The crop land area increased from 2205.48 km² in 1990 to 2986.17 km² in 2024. This 35% growth points to an increase in agricultural activities, which could be attributed to the expansion of farmland or the conversion of other land types to crop production.

Settlement Expansion: The growth of settlements is perhaps the most striking change. From a modest 23.56 km² in 1990, the settlement area has exploded to 52.39 km² in 2024, more than **doubled (122% increase)** in 34 years. This surge in settlement area is a clear indicator of increased urbanization and the development of infrastructure in the district.
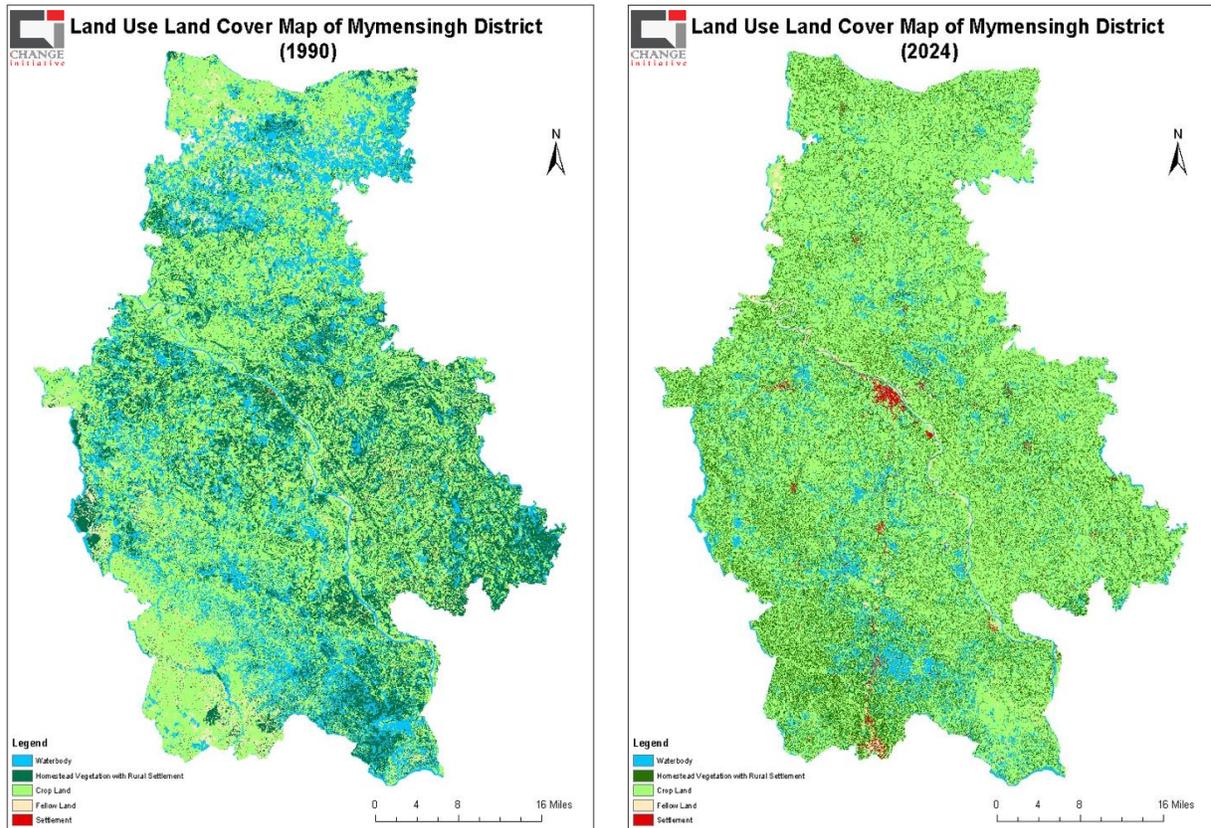
Figure 2: LULC of Mymensingh District (1990-2024)

Source: Change Initiative Analysis, April 2025

Overall Observations: Mymensingh District is evolving with a dual focus on urban expansion and agricultural growth, but these shifts are accompanied by environmental concerns that need attention for long-term sustainability.

a) Crop Land Expansion (+35.40%): Significant increase suggests intensified agricultural use, possibly due to demand for food security and economic gains. It might further propose the conversion of existing wetlands and untouched regions into agriculture.

b) Accelerated growth of settlements (+122.37%): Reflects urbanization and population growth. Could lead to greater stress on nearby agricultural and natural landscapes.

c) Decline in Homestead Vegetation (−18.67%): Indicates loss of traditional agroforestry and rural greenery. Impact on species diversity and microclimatic factors.

d) Major Reduction of Barren Land (−83.83%): Embodies an extensive use of hitherto unused land, which can bring economic gains but may limit land availability for nature restoration or biodiversity preservation.

e) Decline in Waterbodies (−51.92%): A concerning trend, likely caused by encroachment, siltation, or climate-driven hydrological changes. Impacting fishery populations, aquifer replenishment, and ecosystem balance.

Recommendations:

A. **Recognition of Natural Rights and Realtime Monitoring**: The destruction of natural rights to protect natural resources, including forests, rivers, canals, wetlands, and agricultural land, should be considered a crime against nature. Moreover, real-time monitoring and public disclosure of youth participation in urgent nature protection should be ensured, along with significant financial and other penalties.

B. **Prioritize Wetland Conservation and Restoration**

- Launch a district-wide inventory and restoration program with targets to recover at least **100 sq.km** of degraded wetlands by 2030
- Mandate a 50-meter buffer zone around key wetlands and rivers, enforced via satellite monitoring.

C. **Regulate Urban Spread Through Local Masterplans**

- Require all upazilas to update or prepare **structure plans** aligned with projected population growth.
- Cap annual land conversion for settlement at **1.5%** of total district land to reduce encroachment on cropland and wetlands.

D. **Reclaim and Reclassify Abandoned Fellow Land for Reforestation**

- Target reforestation on at least **25% of historically classified fellow land** (approx. 60 sq.km), using community-based afforestation programs

- Incentivize agroforestry on marginal lands through subsidized saplings and extension services.

- **Balance Agricultural Expansion with Resource Efficiency** Introduce **zoning regulations** to protect high-yield zones and prevent encroachment on ecologically sensitive lands.

- Promote **precision farming and micro-irrigation systems** in areas facing water stress, aiming for 30% adoption by 2030.

E. Protecting Homestead Green Cover in Rural Areas

- Enforce a **minimum tree cover requirement** (e.g., 10% per homestead plot in rural land development rules).

- Integrate homestead greening into the Department of Agricultural Extension's training curriculum.

F. Establish a District Land Use Monitoring Dashboard

- Use **annual high-resolution satellite imagery** to update LULC maps.

- Publish updates on a public dashboard with historical comparisons and alerts for critical threshold breaches (e.g., waterbody shrinkage >10%).

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