

Study on the Tree Plantation Drives in Azamgarh District and its Implications

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Abstract

The present study was conducted to evaluate biodiversity conservation drives undertaken in Azamgarh District, Uttar Pradesh, and to examine their environmental, social, and economic implications. Data were collected from 100 respondents through structured questionnaires and personal interviews. The study revealed that 82% of respondents were aware of plantation drives, with educational institutions (28%) and social media (24%) emerging as primary information sources. More than half (61%) had participated in plantation programmes. Clean air (42%) was identified as the greatest benefit, followed by climate regulation (25%), biodiversity conservation (18%), and soil conservation (15%). Neem (24%), Peepal (18%), and Shisham (15%) were the most commonly planted species. Lack of maintenance (40%), water scarcity (28%), low public participation (20%), and grazing (12%) were major challenges. Community participation was considered essential for plantation success. The study concludes that while plantation drives have successfully increased environmental awareness, greater emphasis on post-plantation maintenance, regular monitoring, and community involvement is essential for long-term sustainability.

Keywords: Biodiversity conservation, Afforestation, Environmental awareness, Community participation, Sustainable development

1. Introduction

Forests and trees constitute the foundation of terrestrial ecosystems, providing indispensable ecological services that sustain life on Earth [1]. These services include carbon sequestration through photosynthesis, oxygen production, climate moderation through evapotranspiration, soil stabilization through root systems, and habitat provision for countless species [2]. Throughout human history, trees have supported civilizations by supplying food, fuel, timber, medicine, and shelter, making them integral to both ecological and human well-being [3].

However, the contemporary era has witnessed unprecedented environmental degradation driven by rapid industrialization, urban expansion, intensive agriculture, and population growth [4]. Deforestation rates remain alarmingly high in many developing countries, leading to loss of biodiversity, disruption of water cycles, soil erosion, and increased greenhouse gas emissions [5]. India, home to over 1.4 billion people, faces these challenges acutely, with air pollution, groundwater depletion, and climate vulnerability posing significant threats to sustainable development [6].

The Government of India has responded through various afforestation initiatives including the National Afforestation Programme, Green India Mission, and state-level campaigns such as Van Mahotsav [7]. These programmes collectively aim to increase forest and tree cover, restore degraded ecosystems, enhance carbon sinks, and improve rural livelihoods through forestry-based enterprise development [8]. Tree plantation drives represent organized efforts to increase green cover through mass planting of saplings in public and private spaces [9]. These drives are typically implemented by government agencies, educational institutions, panchayati raj institutions, non-governmental organizations, and community groups. The underlying premise is that increased tree cover will mitigate environmental degradation, enhance ecosystem services, and improve human well-being [10].

The Government of Uttar Pradesh has been particularly active in promoting plantation drives, conducting large-scale campaigns involving district administrations, forest departments, schools, colleges, village panchayats, and voluntary organizations [11]. These programmes aim to increase green cover, reduce pollution, conserve biodiversity, and foster community participation in environmental governance.

Azamgarh District, situated in eastern Uttar Pradesh, exemplifies the challenges and opportunities of plantation-based environmental conservation [12]. Primarily an agricultural district with a population density of approximately 1,200 persons per square kilometer, Azamgarh faces significant pressure on its natural resources. In recent years, plantation drives have been conducted across the district along roadsides, school campuses, government premises, village commons, parks, canals, and agricultural bunds [13]. Species commonly planted include *Azadirachta indica* (Neem), *Ficus religiosa* (Peepal), *Ficus benghalensis* (Banyan), *Terminalia arjuna* (Arjun), *Dalbergia sissoo* (Shisham), *Mangifera indica* (Mango), and *Syzygium cumini* (Jamun).

Prior research has examined various aspects of plantation programmes in India. Tewari [14] documented significant variation in plantation success across Uttar Pradesh based on species selection and site conditions. The study found that species choice, soil quality, and availability of water were the primary determinants of sapling survival.

Datta *et al.* [15] emphasized the critical importance of matching species to specific ecological zones for ensuring long-term survival and ecological benefits. They demonstrated that planting inappropriate species leads to high mortality rates and wasted resources.

Tewari and Singh [16] demonstrated that community participation is fundamental to plantation sustainability, finding that sites with active community involvement had survival rates significantly higher than those managed exclusively by government agencies. Similarly, Srivastava and Ojha [17] showed that participatory approaches in environmental programmes yield better outcomes than top-down implementation.

Tewari *et al.* [18] examined the broader context of environmental pollution and the role of plantation in mitigation. Their work highlighted the multiple benefits of trees in reducing air pollution, regulating temperature, and improving quality of life in urban and rural areas alike.

Despite the extensive implementation of plantation drives, systematic evaluation at the district level remains inadequate. Most assessments focus on numbers of saplings planted rather than survival rates, ecological outcomes, or community impacts [19]. This represents a significant gap because plantation success is ultimately measured not by planting numbers but by the establishment and growth of healthy trees that provide sustained ecosystem services.

The present study addresses this gap by comprehensively evaluating plantation drives in Azamgarh District across multiple dimensions: public awareness, participation patterns, perceived environmental benefits, challenges constraining success, and community perspectives on plantation governance. The specific objectives are to: (1) assess the level of public awareness regarding plantation drives; (2) evaluate patterns of public participation in plantation activities; (3) identify perceived environmental benefits of tree plantation; (4) examine the major challenges affecting plantation success; and (5) suggest measures for improving plantation programmes.

The findings are intended to inform evidence-based improvements in plantation programme design and implementation, contributing to more effective environmental conservation in Azamgarh District and similar regions.

2. Material and Method

Study Area

The research was conducted in Azamgarh District, Uttar Pradesh, India, located between latitudes 25°38' N to 26°27' N and longitudes 82°40' E to 83°45' E. The district encompasses approximately 4,054 square kilometers and experiences a subtropical climate with hot summers (up to 45°C), cold winters (as low as 5°C), and monsoon rainfall averaging 1,100 mm annually, predominantly from July to September. Alluvial soils predominate, supporting intensive agriculture. The district is divided into several administrative blocks, and the study covered both rural and urban areas to ensure representative sampling.

Research Design

A descriptive research design was employed for this study. Descriptive research is appropriate for examining existing conditions, opinions, and behaviors without manipulating variables. This design enabled systematic documentation of plantation drive implementation, community awareness, participation levels, perceived benefits, and challenges in Azamgarh District. The approach is particularly suitable for social and environmental research where understanding current conditions and stakeholder perspectives is essential for policy and programme improvement.

Sampling Technique

The study adopted the Simple Random Sampling Method, where every individual in the selected area had an equal opportunity to become a respondent. This approach reduces selection bias and ensures that the sample represents different sections of society. The sampling frame included residents of Azamgarh District from various demographic backgrounds including age groups, educational qualifications, and occupations.

Sample Size

A total of 100 respondents were selected for the survey. The sample comprised diverse demographic groups including students, teachers, farmers, government employees, shopkeepers, homemakers, and other residents. This sample size, while modest, is considered adequate for achieving the study objectives within available time and resources and provides meaningful insights into community perspectives on plantation programmes.

Data Collection

Primary Data: A structured questionnaire was administered through personal interviews to collect primary data. The questionnaire was prepared in simple language to ensure easy comprehension by respondents from diverse educational backgrounds. Questions covered the following areas:

1. Awareness of tree plantation drives in the locality
2. Participation in plantation activities
3. Sources of information about plantation programmes
4. Perceived environmental benefits of tree plantation
5. Commonly planted tree species
6. Challenges affecting plantation success
7. Views on responsibility for plantation maintenance
8. Level of satisfaction with plantation programmes
9. Suggestions for improvement

Secondary Data: Secondary data were collected from books, research journals, newspapers, government reports, Forest Department publications, environmental studies, and websites related to afforestation and environmental conservation. These sources provided contextual information and helped in interpreting primary findings.

Data Collection Procedure

The researcher personally visited different locations in Azamgarh District including schools, colleges, government offices, residential areas, village panchayats, parks, markets, and public places. Before conducting the survey, respondents were informed about the purpose of the study. Participation was voluntary, and confidentiality of responses was maintained. The collected responses were carefully recorded and organized for analysis.

Data Analysis

The collected data were edited, classified, and tabulated. Percentage analysis and frequency distribution were employed as the primary analytical techniques. These simple statistical methods are appropriate for descriptive survey data and enable clear presentation of findings. The analysed data are presented through tables with descriptive interpretation.

Limitations

The study has several limitations that should be considered when interpreting findings. First, the study was confined to Azamgarh District, limiting generalizability to other regions. Second, the sample size of

100 respondents, while adequate for this exploratory study, may not capture the full diversity of perspectives in the district. Third, time constraints limited the duration of field work. Fourth, some respondents were reluctant to provide detailed information, potentially introducing response bias. Fifth, the findings are largely based on perceptions rather than objective measurement of environmental outcomes. Future research could address these limitations through larger sample sizes, extended fieldwork, and inclusion of objective environmental monitoring.

Ethical Considerations

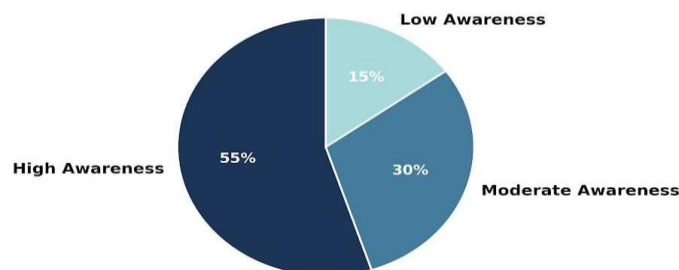
The researcher maintained high ethical standards throughout the study. Participation was voluntary, and informed consent was obtained from all respondents. Anonymity and confidentiality were strictly maintained. No personal identifying information was collected or disclosed. The collected data were used exclusively for academic research purposes.

3. Result and Discussion

Public Awareness of Plantation Drives

The survey revealed that a substantial majority (82%) of respondents were aware of plantation drives conducted in their localities (Table 1). This high awareness level reflects the cumulative impact of sustained government campaigns, media coverage, and educational initiatives over recent years. However, 18% remained unaware, indicating information gaps in remote rural areas or among marginalized communities.

Chart 1: Environmental Awareness Levels



Source: Field Survey Data (2025-2026)

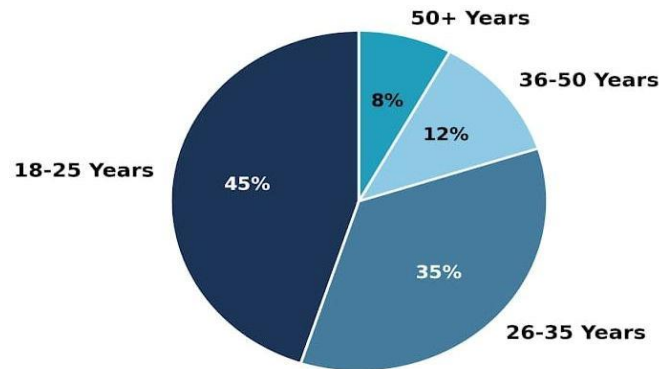
This finding suggests that while plantation programmes have achieved significant reach, further efforts are needed to achieve universal awareness.

Participation in Plantation Activities

Sixty-one percent of respondents had participated in at least one plantation drive (Table 2), indicating substantial community engagement in plantation activities. However, 39% had never participated, citing various reasons including lack of awareness about plantation events, time constraints, and limited opportunities to participate. This participation gap suggests that while awareness is high, structural and motivational barriers continue to limit active involvement. Increasing participation will require not only continuing awareness campaigns but also creating convenient opportunities and incentives for involvement.

Chart 2: Age Distribution of Respondents

Table 2: Age Distribution of Respondents



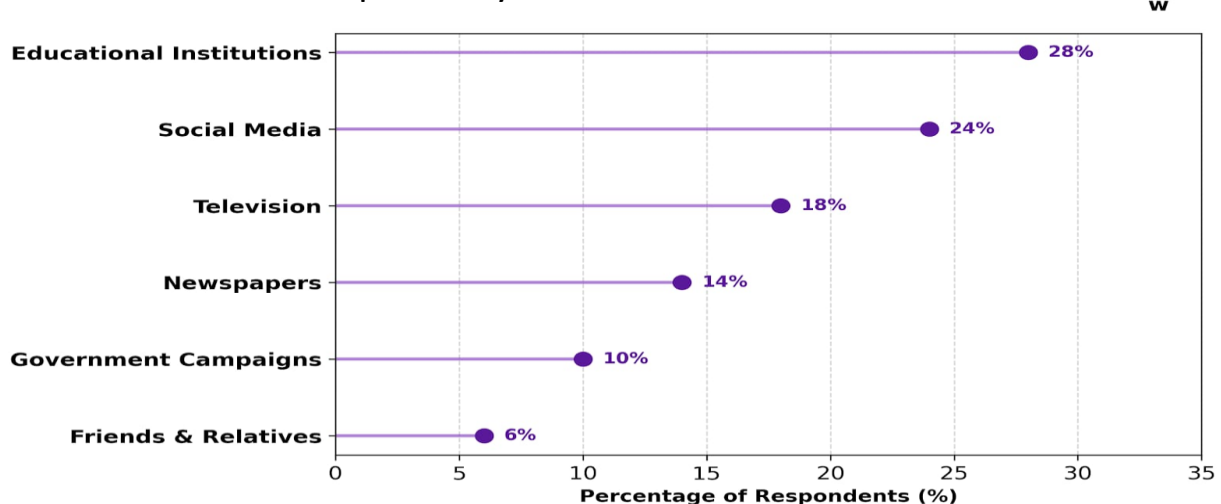
Source: Field Survey Data (2025-2026)

Sources of Information

Educational institutions emerged as the most significant source of plantation information (28%), followed by social media (24%), television (18%), newspapers (14%), government campaigns (10%), and interpersonal networks (6%) (Table 3). The prominence of educational institutions underscores the critical role of schools and colleges in environmental awareness dissemination. This finding highlights the importance of integrating environmental education into school curricula and encouraging educational institutions to take active roles in plantation programmes.

Social media's growing influence (24%) reflects changing communication patterns, particularly among younger demographics. This suggests that environmental communication strategies should increasingly leverage digital platforms to reach wider audiences. Traditional media including television and newspapers continue to play important roles, while government campaigns need strengthening to match the reach of other information sources.

Graph 1: Primary Channels of Environmental Information Flow



Source: Field Survey Data (2025-2026)

Perceived Benefits of Plantation

Respondents identified clean air as the primary benefit of plantation (42%), followed by climate regulation (25%), biodiversity conservation (18%), and soil conservation (15%) (Table 4). The strong emphasis on air quality reflects growing public concern about air pollution and its health impacts. This concern is well-founded, given the deteriorating air quality in many Indian cities and towns.

Climate regulation recognition (25%) indicates increasing awareness of climate change and trees' role in mitigation. This is encouraging as public understanding of climate issues is essential for building support for environmental policies. Biodiversity conservation (18%) and soil conservation (15%) were also recognized, though to a lesser extent, suggesting that these benefits are less visible to the general public.

Table 1: Perceived Benefits of Tree Plantation

Benefit	Percentage
Clean air	42%
Climate Regulation	25%
Biodiversity Conservation	18%
Soil Conservation	15%
Total	100%

Source: Field Survey Data (2025-2026)

Commonly Planted Species

Azadirachta indica (Neem) was the most commonly planted species (24%), followed by *Ficus religiosa* (Peepal, 18%), *Dalbergia sissoo* (Shisham, 15%), *Mangifera indica* (Mango, 14%), *Syzygium cumini* (Jamun, 12%), *Ficus benghalensis* (Banyan, 10%), and *Terminalia arjuna* (Arjun, 7%) (Table 5). The dominance of native, multi-purpose species reflects both institutional preferences and community acceptance.

Table 2: Common Tree Species

Tree Species	Percentage
<i>Azadirachta indica</i> (Neem)	24%
<i>Ficus religiosa</i> (Peepal)	18%
<i>Dalbergia sissoo</i> (Shisham)	15%
<i>Mangifera indica</i> (Mango)	14%
<i>Syzygium cumini</i> (Jamun)	12%
<i>Ficus benghalensis</i> (Banyan)	10%
<i>Terminalia arjuna</i> (Arjun)	7%
Total	100%

Source: Field Survey Data (2025-2026)

Native species generally exhibit better survival rates, lower maintenance requirements, and provide greater ecological and economic benefits compared to exotic alternatives. Neem, for instance, is drought-tolerant, provides shade, produces medicinal products, and has significant cultural value. Peepal and Banyan are culturally significant and support diverse bird and insect populations. Shisham is valued

for its timber, while Mango and Jamun provide edible fruits. This preference for species with multiple benefits is sound practice.

Critical Challenges Constraining Plantation Success

Lack of maintenance was identified as the most significant challenge (40%), followed by water scarcity (28%), low community participation (20%), and animal grazing (12%) (Table 6). This finding reveals a critical implementation gap: while saplings are planted, insufficient attention is given to post-planting care. The "plant and forget" approach undermines programme effectiveness, resulting in high sapling mortality and wasted resources.

Table 3: Challenges Affecting Plantation Success

Challenge	Percentage
Lack of Maintenance	40%
Water Scarcity	28%
Low Community Participation	20%
Animal Grazing	12%
Total	100%

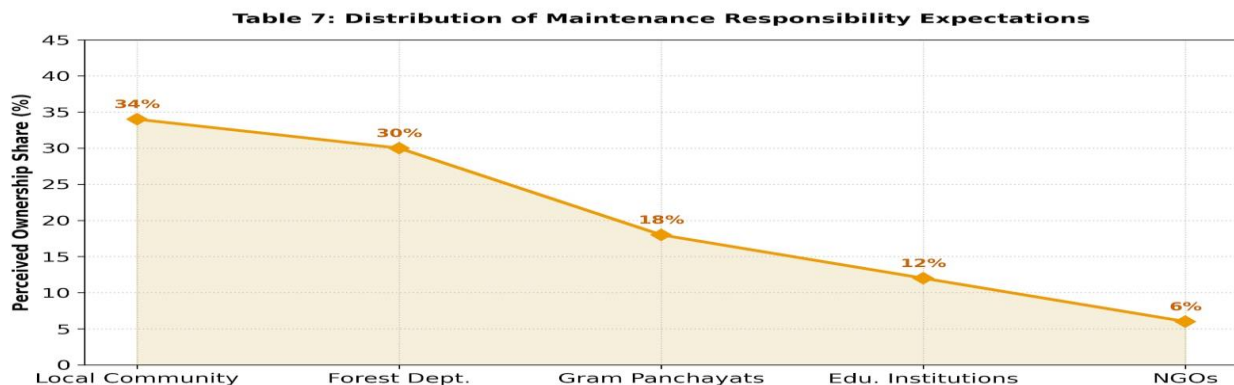
Source: Field Survey Data (2025-2026)

Water scarcity during dry seasons compounds the maintenance problem, particularly in areas away from reliable water sources. This is especially problematic for species with high water requirements. Animal grazing, while affecting fewer respondents (12%), can be devastating at specific sites where livestock are allowed to roam freely. These challenges indicate that plantation planning must include provisions for regular maintenance, water management, and protection from grazing.

Perceptions of Maintenance Responsibility

Respondents assigned primary maintenance responsibility to local communities (34%), followed by Forest Department (30%), Gram Panchayats (18%), educational institutions (12%), and NGOs (6%) (Table 7). This distribution indicates recognition that plantation success requires collaborative governance rather than exclusive reliance on government agencies.

Graph 2: Distribution of Maintenance Responsibility Experience



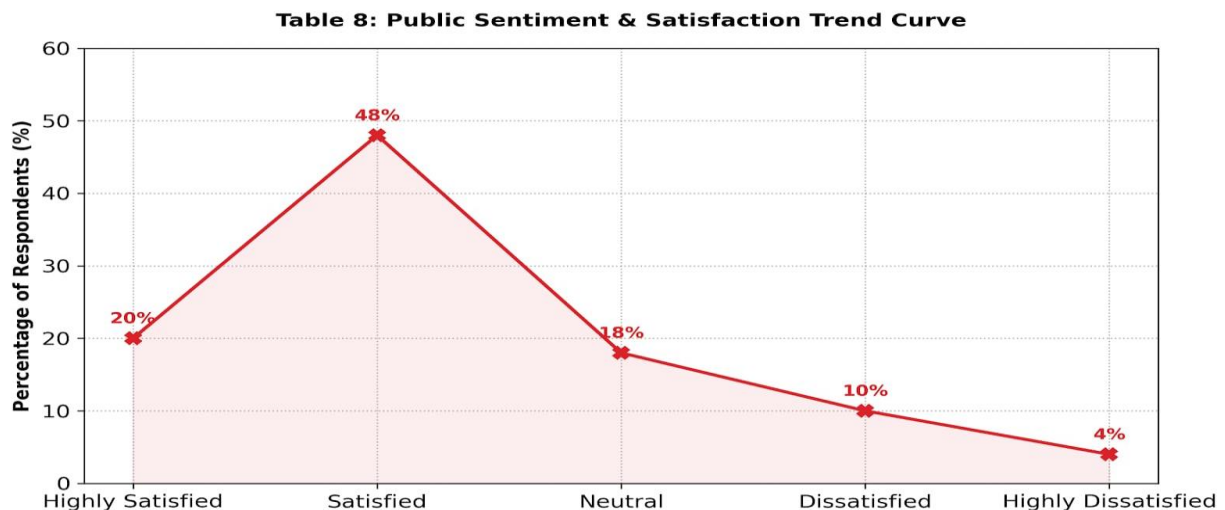
Source: Field Survey Data (2025-2026)

Communities are willing to accept responsibility provided they have adequate support, resources, and institutional frameworks. This finding aligns with participatory environmental governance models that emphasize stakeholder engagement and local ownership. Gram Panchayats and educational institutions are seen as important supporting actors. The relatively low percentage assigned to NGOs suggests their presence in plantation activities is currently limited.

Satisfaction Levels

Forty-eight percent of respondents expressed satisfaction with plantation programmes, while 20% were highly satisfied, 18% neutral, 10% dissatisfied, and 4% highly dissatisfied (Table 8). The combined satisfied/highly satisfied majority (68%) indicates general public support for plantation programmes, which provides a foundation for future expansion and improvement.

Graph 3: Public Sentiment and Satisfaction Trend Curve



Source: Field Survey Data (2025-2026)

However, the 14% dissatisfaction rate signals areas requiring improvement. Dissatisfaction primarily stems from poor sapling survival and lack of follow-up. Addressing these concerns is essential for maintaining public confidence and participation in plantation programmes.

Synthesis and Discussion

The findings collectively paint a nuanced picture of plantation drives in Azamgarh District. Awareness has reached high levels (82%), and participation, though not universal, is substantial (61%). Communities clearly recognize the environmental benefits, with air quality and climate regulation being the most valued. Native species are appropriately prioritized, reflecting good practice in species selection.

However, significant challenges constrain effectiveness. The maintenance deficit is the most critical issue, with 40% of respondents citing it as the primary constraint. This reflects a systemic weakness in programme design: plantation initiatives prioritize the symbolic act of planting over the more

demanding, less visible work of ensuring survival and growth. Water scarcity during dry seasons further compounds the problem, particularly in areas away from reliable water sources.

The survey reveals a strong preference for community-based maintenance, indicating that local communities are ready to assume greater responsibility if given appropriate support. This finding aligns with participatory environmental governance models that emphasize stakeholder engagement and local ownership.

Community participation emerges as both a challenge and a solution. While low participation is cited as a problem, respondents also identify communities as the primary agents for addressing the maintenance challenge. This apparent paradox suggests that participation deficits can be overcome through institutional mechanisms, capacity building, and incentive structures that enable communities to take ownership of plantation programmes.

The study's findings are broadly consistent with previous research on plantation programmes in Uttar Pradesh. Tewari documented similar species preferences and survival challenges. Datta et al. similarly emphasized the importance of species-site matching. The central role of community participation documented here echoes the conclusions of Tewari and Singh and aligns with international experience in community-based natural resource management.

The findings suggest that improving plantation effectiveness requires a shift in focus from planting numbers to survival outcomes. This would involve developing participatory governance mechanisms, integrating water management into plantation planning, and institutionalizing monitoring systems. Educational institutions should be strengthened as both awareness channels and active participants in plantation and maintenance. Government campaigns need to reach underserved populations and address the information gaps that persist among the 18% of respondents who remain unaware of plantation drives.

4. Conclusion

This study evaluated tree plantation drives in Azamgarh District through a survey of 100 respondents. The findings reveal that plantation programmes have successfully raised environmental awareness, with 82% of respondents aware of such initiatives. Participation, though substantial at 61%, remains incomplete, indicating room for enhanced community engagement. Educational institutions and social media are the primary channels for environmental information dissemination.

Respondents recognize multiple benefits of plantation, with clean air being most valued (42%), followed by climate regulation (25%), biodiversity conservation (18%), and soil conservation (15%). The preference for native species including Neem, Peepal, and Shisham reflects sound ecological practice.

However, plantation effectiveness is severely constrained by inadequate post-planting maintenance (40%), water scarcity (28%), and limited community participation (20%). Communities perceive themselves as responsible for maintenance (34%) but require institutional support and resources to fulfill this role effectively.

The study concludes that plantation drives have significant potential for environmental improvement but require fundamental redesign to address maintenance deficits and strengthen community engagement. Shifting focus from planting numbers to survival outcomes, developing participatory governance mechanisms, integrating water management, and institutionalizing monitoring systems are essential for realizing plantation programmes' environmental and social benefits.

Environmental conservation is the collective responsibility of government agencies, educational institutions, local communities, and individual citizens. Sustainable plantation programmes, combined with environmental education and community participation, can significantly improve the ecological health of Azamgarh District. By ensuring the survival of planted trees and encouraging people to take responsibility for environmental protection, plantation drives can contribute to a cleaner, healthier, and more sustainable future.

5. Recommendations

Based on the findings, the following recommendations are made:

1. **Ensure Regular Maintenance:** Plantation drives should include provisions for continuous watering, weeding, pruning, and protection from pests. A maintenance schedule with clearly assigned responsibility should be prepared for each plantation site. This should extend for at least three years after planting.
2. **Strengthen Monitoring and Evaluation:** Regular inspections by Forest Department, local administration, and Gram Panchayats should be conducted throughout the year. Digital records, GPS mapping, and photographic documentation can be used to monitor plantation sites and evaluate programme success.
3. **Increase Community Participation:** Community-based plantation committees should be formed at village level. Residents should be encouraged to participate in both planting and maintenance activities. Recognition and incentives can be provided for successful community participation.
4. **Promote Environmental Education:** Schools and colleges should organize seminars, workshops, competitions, and awareness campaigns. Environmental education should emphasize the importance of tree plantation, biodiversity conservation, climate change, and sustainable development. Students should be encouraged to adopt and maintain planted saplings.
5. **Plant Native Species:** Preference should be given to native species well adapted to local climate and soil conditions. Species such as Neem, Peepal, Banyan, Arjun, Shisham, Mango, and Jamun have higher survival rates and provide long-term environmental and economic benefits.
6. **Improve Water Management:** Rainwater harvesting systems, drip irrigation, and water storage structures should be developed to ensure regular water supply for saplings, especially during summer months.
7. **Protect Saplings:** Protective fencing, tree guards, and community vigilance should be provided to prevent damage from grazing animals. Local residents and village committees should be encouraged to report damage and take responsibility for protection.
8. **Enhance Public Awareness:** Continuous awareness campaigns should be organized through newspapers, television, radio, social media, and public meetings. Special events during Van Mahotsav and World Environment Day can motivate participation.

9. **Involve Educational Institutions:** Every school and college should organize annual plantation programmes. Environmental clubs should be formed for monitoring and awareness activities.
10. **Promote Public-Private Partnerships:** Government agencies should collaborate with NGOs, corporate organizations, and local industries for financial and technical support. CSR initiatives can contribute to large-scale plantation programmes.

6. Nomenclature

Abbreviation	Full Form
NGO	Non-Governmental Organization
GPS	Global Positioning System
CSR	Corporate Social Responsibility
GIS	Geographic Information System

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