IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 2, February 2024

DOI: 10.17148/IARJSET.2024.11209

A SURVEY ON HABITATION OF SAPLINGS

GANASHREE KN[1], M VAISHNAVI[2], NANDIGAM SRAVITHA[3], D LIKITHA RAJU[4], THEJHASHVIN N[5], ROOPA K MURTHY[6]

Student, Artificial Intelligence and Machine Learning, K S Institute of Technology, Bengaluru, India 1-5

Professor, Artificial Intelligence and Machine Learning, K S Institute of Technology, Bengaluru, India 6

Abstract: The global landscape is undergoing significant changes, and sustainable urban planning is a critical aspect for creating resilient and liveable cities. A survey was conducted to understand public perceptions and attitudes towards urban planning initiatives, focusing on environmental considerations and community engagement. Key themes included awareness of urban planning concepts, preferences for green spaces, opinions on transportation infrastructure, and expectations regarding community involvement in decision-making processes. Demographic variables such as age, income, and educational background were also explored. The findings provide valuable insights into public understanding and priorities in urban planning, enabling planners and policymakers to tailor initiatives to align with community expectations, fostering a more sustainable and harmonious urban environment.

Keywords: Plantation, Environment, Afforestation, Reforestation, Ecology, Deforestation, Geomorphology.

1. INTRODUCTION

The field of explanations, encompassing theories, models, and applications, has a crucial role in understanding the rationale behind decisions, actions, and phenomena in various domains such as artificial intelligence, human cognition, social interactions, and natural phenomena. This survey paper provides a comprehensive overview of the landscape of explanations, delving into the rich tapestry of research and advancements that have shaped this interdisciplinary field. The need for explanations is fundamental to human cognition, decision-making, and communication, and exploring the foundations of explanatory mechanisms holds immense significance in both academic and practical contexts. The practical application of explanations across different domains are also discussed, highlighting the real-world implications of robust explanations,explores case studies, applications, and success stories that showcase the tangible impact of explanatory models in addressing challenges and fostering innovation. The goal is to provide a roadmap for researchers, practitioners, and enthusiasts interested in understanding, developing, and applying explanations in various contexts.

2. LITERATURE REVIEW

SNO	YEAR OF PUBLICATION	PROJECT TITLE	DESCRIPTION
1	2023	A Mapping Approach for *Eucalyptus* Plantations Canopy and Single Tree Using High-Resolution Satellite Images in Liuzhou, China.[1]	Canopy and single tree mapping is necessary in obtaining the information on ecological and bio-geophysical forests. An approach of mapping the combinations of the images using Eucalyptus Uniform Manifold Approximation and Projection (EUMAP) algorithm. This highlights the red/blue/green bands high-resolution images to differentiate the canopy and single tree Eucalyptus plantations. EUMAP study includes canopy tree adaptation and adaptive iterative erosion. This study uses the forest mapping using satellite images rather than the traditional method. The results shows that there were 7033021 Eucalyptus which had 819 trees per hectare i.e,88.34% to 86.40%.
2	2022	Extraction of Sugarcane Planting Area Based on Similarity of NDVI Time Series.[2]	Sugarcane planting is very important to sugar development and country's sugar production. This paper implements the decision tree model which indicates the similarity on sugarcane Normalized Difference Vegetation Index (NDVI) and spectral

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 2, February 2024

DOI: 10.17148/IARJSET.2024.11209

			reconstruction method. Using this method, it was found that the sugarcane plantation had an accuracy of 96%. This method helps in maintaining the sugarcane production and to gain the information about the structure of the sugarcane plant.
3	2022	Above Ground Biomass Estimation of a Cocoa Plantation using Machine Learning.[3]	The traditional methods do not provide required information, hard to calculate and time-consuming. This paper implements Light Detection and Ranging (LiDAR) method and the Machine Learning (ML) algorithms to study the Above Ground Biomass (AGB) of Cocoa Trees in the region. Both algorithms are used to calculate the Diameter of tree at Breast Height (DBH). The estimate was found to be 14.7% which was lower than the allometric equation. This signifies that LiDAR and ML algorithms are quite promising.
4	2021	Perspectives on the socio-economic challenges and opportunities for tree planting: A case study of Ethiopia.[4]	derived the paper emphasised that Ethiopia is aiming to restore 15 of the 127.7 million hectares pledged by 31 African countries as of June 2021 through tree planting. However, socio-economic challenges in designing, implementing, and monitoring tree planting activities are evident. A literature review and expert assessments are used to analyse the historical context of deforestation, afforestation, and reforestation in Ethiopia. The socio-political environment in Ethiopia enables successful tree planting, but there is a need to pay more attention to the socio-economic dimension of tree planting, particularly considering the needs and participation of local communities. There is a high risk of afforestation being misidentified as reforestation, insufficient consideration of local community participation, benefit sharing, land tenure issues, and insufficient marketing for forest products from planted and natural forests. Recommendations include raising awareness about the risk of confounding afforestation and reforestation, promoting bottom-up approaches to tree planting, assisting local communities in securing long-term rights and benefits over land, and improving financial returns from tree planting activities while creating opportunities for the private sector.
5	2020	Drivers of native species regeneration in the process of restoring natural forests from mono-specific, even-aged tree plantations: a quantitative review.[5]	The paper suggested that a substantial proportion of existing tree plantations are established followed by the demolishment of native forests, leading to increasing demands for ecological restoration. However, there is a lack of integrated knowledge on how best to restore these forests. Studies reviewed 68 studies identified the main factors determining the establishment success of regeneration of native woody species. Results showed that herbivory, within-gap position, soil properties, and ground cover type and structure had limited influence on regeneration, showing significant effects in less than 26% of cases. However, spatial landscape configuration, overstorey structure, ground vegetation structure, overstorey composition, and climate and geomorphology had significant effects in 67, 47, 47, 52, and 63% of cases. Regeneration diversity and abundance increased with proximity to natural vegetation remnants and seed sources. To optimize

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 2, February 2024

DOI: 10.17148/IARJSET.2024.11209

			restoration, adopt interventions that prove most effective and prioritize more responsive stand types.
6	2019	Land restoration by tree planting in the tropics and subtropics improves soil infiltration, but some critical gaps still hinder conclusive results.[6]	Infiltration is a crucial hydrological process in ecosystems, influencing soil erosion control, runoff, soil moisture content, and groundwater recharge. Tree planting has become a popular method for restoring forests, particularly in the tropics and subtropics. A systematic review of 11 studies found that infiltration increases but is not fully recovered to reference conditions in forests restored by tree planting. Recovery varied depending on land-use, soil texture, and restoration age. Cultivated soils showed higher infiltration recovery than pastures and bare soils. Clayey soils also showed higher infiltration recovery than sandy soils. However, knowledge gaps need to be addressed to improve understanding of when and why tree planting can promote infiltration recovery in tropical and subtropical soils. Information on recovery capacities and monitoring over time is scarce, and details on the effects of different forest restoration techniques on infiltration are virtually unknown. Additionally, information on the influence of disturbance level on infiltration prior to tree planting is also lacking.
7	2018	A systematic review of the socio-economic impacts of large-scale tree plantations, worldwide.[7]	Large-scale tree planting has proved problematic. since their debut in the 1980s, sparking disputes on its socioeconomic implications. A comprehensive assessment of 20,450 papers showed that most of the consequences were negative, with jobs, land, livelihoods, and societal aspects receiving the most attention. Southeast Asia, South America, Africa, and Australasia had the most documented impacts. According to the study, the expenses of large-scale tree plantings are borne by inhabitants first, particularly when they displace customary land usage. However, the long-term socioeconomic benefits are restricted due to methodological errors and under-representation of regions known to have seen plantation growth.
8	2017	Local impacts of industrial tree plantations: An empirical analysis in Indonesia across plantation types.[8]	It suggested that Industrial tree plantations in Indonesia are controversial, and understanding their perceived impacts is crucial for their integration in rural landscapes. A 2016 survey of 606 respondents in villages near acacia, teak, and pine plantations revealed that pine and teak plantations are perceived to offer more benefits, positive impacts, better environmental record, and more opportunities for local people to improve their livelihoods. However, villagers around acacia pulpwood plantations often seek economic development and infrastructure to open remote areas, but their expectations are often only partially met. The study recommends clarifying the State's role in plantations, recognizing institutions as intermediaries, and accommodating community contributions to management plan design.
9	2016	A stand of trees does not a forest make: Tree plantations and forest transitions.[9]	A strong contribution for Global afforestation and reforestation programs aim to increase tree cover, including plantations, which supply global markets such as pulp and wood demand, energy, food, and

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 2, February 2024

DOI: 10.17148/IARJSET.2024.11209

			carbon. Tree plantations, which replace native forests, cultivated agriculture, or cleared land, are essentially commodity crops with global market drivers and do not provide the same ecosystem services as native forests. However, they are counted as "forest" by global programs. A study using longitudinal multi-temporal satellite imagery in southern Chile found that plantations were established in foothills of predominantly agricultural watersheds, with half of them planted on agricultural or cleared lands that were deforested years ago. Tree plantations were not associated with rural population loss, but with the amount of potential usable land. When native forests and tree plantation classes are disaggregated, land in coastal catchments converted to tree plantation is related to lower quality nearshore resources. Users can manually control systems via a mobile app. This integration aims to optimize efficiency and production in outdoor farming by automating crucial decisions.
10	2015	Agronomic and environmental effects of land application of residues in short-rotation tree plantations: A literature review.[10]	The paper explores Land application of organic wastes in short-rotation plantations is a low-cost way to satisfy fertilizer requirements while also recycling waste. According to studies, organic wastes such as manure, compost, sewage sludge, and wastewater promote plant development, whereas ashes have a lower influence. There are minimal negative consequences, with the exception of salt-rich effluents that do not kill plants. Fast-growing species in extensive tree plantations may absorb excess fertilizers, heavy metals, and antibiotics without causing significant harm. Heavy metal deposition may occur, however there are rare reports of leaching or water contamination. Dose and intervals are critical in preventing environmental leakage.
11	2014	Factors influencing urban tree planting program growth and survival in Florida, United States.[11]	Urban tree planting initiatives can have long-term benefits if high levels of mortality after installation are addressed. Past projects funded by the Florida Forest Service were revisited two to five years after installation to assess tree survival and growth. Factors such as soil compaction, irrigation, species, nursery production method, and initial size at planting were assessed. Results showed a high establishment rate for 2354 trees, with 93.6% alive at the final inspection. On-site irrigation was crucial for tree survival, especially for Magnolia grandiflora. The study validates current program policies, including tree quality maintenance within the first year after planting, and offers insights into the impacts of planting season and nursery stock size on plant growth and development.
12	2010	What can tree plantations do for forest birds in fragmented forest landscapes? A case study in southern Brazil.[12]	The study aims to evaluate the ecological function of tree plantations in fragmented landscapes in southern Brazil, focusing on bird species and avian groups. The research compares the richness and abundance of bird species in natural forests to adjacent Araucaria plantations and pine plantations in South America. The study also evaluates the impact of tree plantations on avian groups' richness, feeding habits, foraging strata, and threatened species. The fixed 100 m radius point-counts method was used, and 114 bird species were

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 2, February 2024

DOI: 10.17148/IARJSET.2024.11209

			recorded in all areas. Results show that richness and abundance were lower in pine plantations than in natural forests and Araucaria plantations. However, Araucaria plantations can serve as habitats for many bird species, particularly forest-dependent species, insectivores, frugivores, and species at different threat categories.

3. CONCLUSION

Contemporary challenges in plantation management are a significant concern, highlighting the need for sustainable and responsible practices. Plantations, which are vital for meeting global demands for commodities like timber, paper, and agricultural products, have been linked to deforestation, biodiversity loss, and social issues. To address these challenges, strategies must be developed that balance the economic benefits of plantations with the preservation of ecosystems and the well-being of local communities. Interdisciplinary collaboration, innovative technologies, and inclusive governance are essential for addressing the complexities of plantation management. Future research should focus on refining sustainable practices, exploring alternative models, and fostering a holistic approach that considers environmental conservation, social equity, and economic viability. By embracing sustainability principles, we can create a future where plantations contribute to global development without compromising the health of our planet and its inhabitants.

REFERENCES

[1] S. Zhang et al., "A Mapping Approach for Eucalyptus Plantations Canopy and Single Tree Using High-Resolution Satellite Images in Liuzhou, China," in IEEE Transactions on Geoscience and Remote Sensing, vol. 61, pp. 1-13, 2023, Art no. 4410413, doi: 10.1109/TGRS.2023.3327128.
[2] S. Deng, M. Gao, C. Ren, S. Li and Y. Liang, "Extraction of Sugarcane Planting Area Based on Similarity of NDVI Time Series," in IEEE Access, vol. 10, pp. 117362-117373, 2022, doi: 10.1109/ACCESS.2022.3219841.
[3] S. Sankar, M. Lewis and P. Hosein, "Above Ground Biomass Estimation of a Cocoa Plantation using Machine Learning," 2022 IEEE International Conference on Data Mining Workshops (ICDMW), Orlando, FL, USA, 2022, pp. 1-8, doi: 10.1109/ICDMW58026.2022.00147.
[4] Boissière, Manuel, Stibniati Atmadja, Manuel R. Guariguata, Habtemariam Kassa, and Plinio Sist. "Perspectives on the socio-economic challenges and opportunities for tree planting: A case study of Ethiopia." Forest Ecology and Management 497 (2021): 119488.
[5] Kremer, Klaus N., and Jürgen Bauhus. "Drivers of native species regeneration in the process of restoring natural forests from mono-specific, even-aged tree plantations: a quantitative review." Restoration Ecology 28, no. 5 (2020): 1074-1086.
[6] Lozano-Baez, Sergio E., Miguel Cooper, Paula Meli, Silvio FB Ferraz, Ricardo Ribeiro Rodrigues, and Thomas J. Sauer. "Land restoration by tree planting in the tropics and subtropics improves soil infiltration, but some critical gaps still hinder conclusive results." Forest Ecology and Management 444 (2019): 89-95.
[7] Malkamäki, Arttu, Dalia D'Amato, Nicholas J. Hogarth, Markku Kanninen, Romain Pirard, Anne Toppinen, and Wen Zhou. "A systematic review of the socio-economic impacts of large-scale tree plantations, worldwide." Global environmental change 53 (2018): 90-103.
[8] Pirard, Romain, Henri Petit, and Himlal Baral. "Local impacts of industrial tree plantations: An empirical analysis in Indonesia across plantation types." Land Use Policy 60 (2017): 242-253.
[9] Van Holt, Tracy, Michael W. Binford, Kenneth M. Portier, and Rodrigo Vergara. "A stand of trees does not a forest make: Tree plantations and forest transitions." Land Use Policy 56 (2016): 147-157.
[10] Marron, Nicolas. "Agronomic and environmental effects of land application of residues in short-rotation tree plantations: A literature review." Biomass and bioenergy 81 (2015): 378-400.
[11] Koeser, Andrew K., Edward F. Gilman, Maria Paz, and Chris Harchick. "Factors influencing urban tree planting program growth and survival in Florida, United States." Urban Forestry & Urban Greening 13, no. 4 (2014): 655-661.
[12] Volpato, Graziele Hernandes, Vitor Miranda Prado, and Luiz dos Anjos. "What can tree plantations do for forest birds in fragmented forest landscapes? A case study in southern Brazil." Forest Ecology and Management 260, no. 7 (2010): 1156-1163.

