

**Dr. Manisha Singh**  
**Dr. Neeta Baglari**  
**Dr. Sima Kalita**  
**Dr. Komal Patel**

# **Academic Synergy: A Multidisciplinary Research Outlook**

**Dr.Manisha Singh**

Assistant Professor, Department of Psychology  
Lingaya's Vidyapeeth (Deemed to be University)  
Faridabad, Haryana

**Dr.Neeta Baglari**

Assistant Professor, Department of Education  
Cotton University, Assam

**Sr.Sima Kalita**

Associate Professor, Department of Education  
Gauhati University, Gauhati

**Dr.Komal Patel**

Associate Professor  
Sunshine Group of Institutions, Rajkot



[www.multispectrum.org](http://www.multispectrum.org)

**Edition: First**

**Year: March 2026**

**ISBN: 978-81-999601-7-6**

**DOI: 10.65647/msp/108/2026**

**All Rights Reserved:** No part of this publication can be stored in any retrieval system or reproduced in any form or by any means without the prior written permission of the publisher.

**© Publisher**

**Publisher**



*(International Publisher)*

Kanyakumari, Tamilnadu, India.

Branch: Chennai & Australia

Phone: +91 6384730258

E-Mail: [editor@multispectrum.org](mailto:editor@multispectrum.org)

[www.multispectrum.org](http://www.multispectrum.org)

## CONTENTS

| S.NO | TITLE & AUTHORS                                                                                                                                                             | PAGE NO |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 1    | Impact of Globalization on Small and Medium Enterprises (SMEs)<br><i>Dr.G.Philomine Joan &amp; Dr.P.Ganesh</i>                                                              | 1-16    |
| 2    | Influence of Social Media Marketing on Brand Loyalty Among Gen Z Consumers<br><i>Dr.P.Ganesh &amp; Dr.G.Philomine Joan</i>                                                  | 17-33   |
| 3    | Restructuring Teacher Education for New India: A Study of the Integrated B.Ed. Model<br><i>Himi Saikia</i>                                                                  | 34-40   |
| 4    | Regenerative Rehabilitation in Sports Medicine<br><i>Dr. Aweek Nandy</i>                                                                                                    | 41-47   |
| 5    | Amplitude-Based Training in Parkinson's Disease: Principles and Clinical Application<br><i>Dr. Krittika Pal</i>                                                             | 48-63   |
| 6    | Comprehensive Advanced Physiotherapy in Ankylosing Spondylitis: Advancing Mobility, Clinical Outcomes, and Quality of Life<br><i>Dr. Paramita Biswas</i>                    | 64-74   |
| 7    | Recent Advancements in Physiotherapy and Multimodal Rehabilitation for Degenerative Cervical Spine Disorders<br><i>Dr. Samarth Gupta</i>                                    | 75-89   |
| 8    | Motor Rehabilitation in Cerebral Palsy: Contemporary Perspectives<br><i>Dr. Shelina Jahan Tithi</i>                                                                         | 90-101  |
| 9    | Overview of Function and Dysfunction of the Lumbar Spine: A Biomechanical and Clinical Integration with the Positional Fault Concept<br><i>Dr. Sourangshu Bhattacharyya</i> | 102-111 |
| 10   | From Neural Disruption to Functional Recovery: Advanced Physiotherapy in Bladder Rehabilitation<br><i>Dr. Soumi Das</i>                                                     | 112-122 |

|    |                                                                                                                                                                                             |         |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 32 | Tourism Development in Lakshadweep: An Empirical Study with Special Focus on Agatti Island<br><i>Mr. Mohammed Moinudheen Havva Manzil, Ms. Sarika Chandrasekharan P</i>                     | 275-279 |
| 33 | Chemical Composition of Natural Plant Latex and their Applications<br><i>Sarabjan Deori<sup>1</sup> Partha Pratim Gogoi<sup>2</sup>, Nichan Boruah</i>                                      | 280-291 |
| 34 | Revisiting the Philosophy of Social Justice in Ambedkar's thought<br><i>Debajani Nath &amp; Debabrata Das</i>                                                                               | 292-297 |
| 35 | AI-Based Interview Preparation and Evaluation System<br><i>Ms. J. Jerlin Adaikala Sundari &amp; Yazhini Ramu Vanathi</i>                                                                    | 298-301 |
| 36 | Spatial and Temporal Patterns of River Bank Shifting of Jia Bharali River, Assam, India, Using Remote Sensing and GIS Techniques<br><i>Pranamika Deka<sup>&amp;</sup> Shikharani Rongpi</i> | 302-308 |
| 37 | Attitude of Teachers and Parents Towards Inclusive Education in Schools Under Dalu Block, West Garo Hills District, Meghalaya<br><i>Dr. Angeleen Lyngdoh &amp; Biangchi M Marak</i>         | 309-311 |
| 38 | Climate Change Projections Using CMIP6 Models and Shared Socioeconomic Pathways: Advances and Implications for Hydrological Systems<br><i>Nida Fatma, Amina Jafri, Monowar Alam Khalid</i>  | 312-317 |
| 39 | Contemporary Challenges in Agroecosystems and Innovative Remediation Strategies for Sustainable Development<br><i>Amina Jafri, Nida Fatma, Pranjali Tripathi</i>                            | 318-322 |
| 40 | The Study on Fraud, Security, and Misuse of AI in Finance<br><i>Arpitha T V, Abhiram Krishna, Preetha P R</i>                                                                               | 323-326 |
| 41 | Neuro-Management: Integrating Brain Science With Leadership and Organizational Behavior<br><i>Mrs. S. Karpagapriya &amp; Ms. M. Karthiga</i>                                                | 337-332 |
| 42 | Algorithmic Bias and Fairness in AI-Based Recruitment: Examining Transparency, Diversity Outcomes, and Ethical Implications<br><i>Ms. M. Abarna &amp; Mrs. S. Santhana Jeyalakshmi</i>      | 333-339 |

### Contemporary Challenges in Agroecosystems and Innovative Remediation Strategies for Sustainable Development

Amina Jafri, Nida Fatma, Pranjali Tripathi

Department of Environmental Science, Integral University, Lucknow

#### Abstract

Agroecosystems, the dynamic interface between agriculture and the environment, are increasingly strained by contemporary challenges such as climate change, soil degradation, biodiversity loss, water scarcity, and the overuse of chemical inputs. These pressures threaten food security, ecosystem resilience, and the long-term viability of agricultural practices. Addressing these issues requires a paradigm shift toward sustainable development that integrates ecological balance with socio-economic progress. Innovative remediation strategies ranging from precision agriculture, biofertilizers, and phytoremediation to regenerative farming, circular resource management, and digital technologies offer promising pathways to restore ecosystem health while enhancing productivity. This paper explores the multifaceted challenges confronting agroecosystems and evaluates cutting-edge solutions that align with the principles of sustainability. By synthesizing scientific insights and practical approaches, it underscores the importance of holistic, adaptive, and inclusive strategies to ensure resilient agroecosystems capable of meeting global food demands without compromising environmental integrity.

Keywords: Agroecosystems, Environmental integrity, Sustainable Development

#### 1. Introduction:

Agroecosystems, the dynamic interaction between agriculture, environment, and society are at the heart of global food security and ecological balance. Yet, they face unprecedented challenges in the 21st century. Rapid population growth, climate change, soil degradation, water scarcity, biodiversity loss, and the overuse of chemical inputs have placed immense pressure on agricultural systems. These issues not only threaten productivity but also compromise ecological resilience and long-term sustainability.

To address these challenges, innovative remediation strategies are emerging as crucial pathways toward sustainable development. Approaches such as precision agriculture, bio-remediation, regenerative farming, integrated pest management, and the use of renewable energy in farming practices are reshaping how we view and manage agroecosystems. Moreover, the integration of modern technologies like artificial intelligence, remote sensing, and biotechnology offers new opportunities to optimize resource use, restore degraded lands, and reduce environmental footprints.

The central goal is to harmonize agricultural productivity with ecological integrity. By adopting innovative strategies, societies can move toward sustainable agroecosystems that not only feed the growing population but also safeguard natural resources for future generations. This topic thus emphasizes the urgent need for interdisciplinary solutions, policy support, and community engagement to ensure that agriculture evolves in a way that is both productive and sustainable.

### Literature Review

#### Soil Degradation & Pollution

- Overuse of synthetic fertilizers and pesticides has led to nutrient imbalance, reduced biodiversity, and contamination of soil and water systems.
- Emerging contaminants (pharmaceutical residues, microplastics, heavy metals) are increasingly detected in agricultural soils, threatening food safety and ecosystem health.

#### Climate Change Impacts

- Rising temperatures, erratic rainfall, and extreme weather events disrupt crop cycles and soil stability.
- Increased greenhouse gas emissions from intensive farming practices exacerbate global warming.

#### Loss of Biodiversity

- Monocropping and habitat fragmentation reduce pollinator populations and soil microbial diversity, weakening ecosystem resilience.

#### Anthropogenic Pressure

- Overexploitation of land resources and unsustainable irrigation practices accelerate salinization, erosion, and desertification.

#### Innovative Remediation Strategies

##### • Bio-Based Approaches

- Use of biochar, compost, and microbial inoculants to restore soil fertility and enhance carbon sequestration.
- Phytoremediation (plants absorbing contaminants) and microbial bioremediation (bacteria/fungi breaking down pollutants) are gaining traction.

##### • Nanotechnology

- Nano-enhanced fertilizers and remediation agents improve nutrient delivery and pollutant breakdown.
- Nanoparticles are being explored for targeted removal of heavy metals and pesticides.

##### • Advanced Monitoring & Sensors

- Real-time soil health monitoring using smart sensors enables precision agriculture and early detection of contamination.
- Integration of AI and IoT systems supports adaptive management strategies.

##### • Circular Economy Practices

- Recycling agricultural waste into bioenergy or soil amendments reduces dependency on synthetic inputs.
- Promotes sustainable nutrient cycles and minimizes environmental footprint.

#### Methodology Used:

##### 1. Research Design

- **Approach:** Mixed-methods (qualitative + quantitative) to capture both ecological data and socio-economic perspectives.
- **Scope:** Agroecosystems under stress due to climate change, soil degradation, water scarcity, biodiversity loss, and pollution.
- **Objective:** Identify key challenges and evaluate innovative remediation strategies that align with sustainable development goals (SDGs).