



Natural Education and Sustainable Development

International Symposium on Urban Biodiversity and Sustainable Development (Asia Region)
Xiamen, China 19th-22nd February 2025

Prof. Xiaorui Guo
College of Chemistry, Chemical Engineering and Resource Utilization, NEFU





CONTENT

01

**Introduction to
Natural Education**

02

**Case Studies: Natural
Education in Action**

03

**Challenges and
Innovative Solutions**

04

**Northeast Forestry
University' s contributions**

05

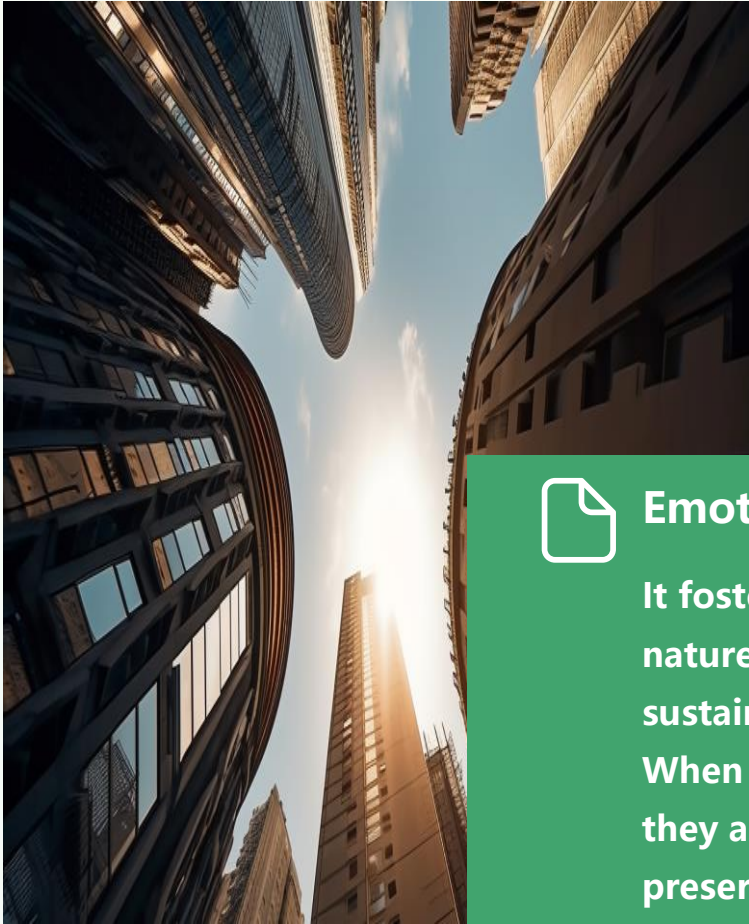
**Conclusion and Call
to Action**



PART 1

Introduction to Natural Education

Definition and Core Values



Ecological Literacy

Natural education goes beyond facts, focusing on ecological literacy. It enables individuals to understand ecosystems and their interdependencies.

This literacy empowers people to make informed decisions that promote sustainability and protect biodiversity.



Emotional Connection

It fosters a deep emotional bond with nature, crucial for motivating sustainable actions.

When people feel connected to nature, they are more likely to take steps to preserve it.



Lifelong Learning

Natural education is a lifelong process, starting from childhood and continuing through adulthood. Continuous learning ensures that individuals stay updated on environmental issues and solutions.

Importance in Urban Settings



Urbanization Trends

Over 55% of the global population lives in cities, projected to rise to 68% by 2050 (UN data).

Cities are the epicenters of human activity, making urban natural education essential.



Urban Biodiversity

Urban biodiversity, from parks to rooftop gardens, is critical for climate resilience, mental health, and food security.

These green spaces act as natural buffers against environmental challenges.



Disconnect and Reconnection

Urbanization often disconnects people from nature, leading to a lack of awareness and appreciation.

Natural education rebuilds this connection, making urban residents active stewards of the environment.



PART 2

Case Studies: Natural Education in Action

Northeast Forestry University's Green Campus Initiative



01

Campus Transformation

Transforming the campus into a living laboratory for biodiversity. Planting native species like Manchurian walnut and Korean pine restores habitats and enhances biodiversity.

Wildlife Support

Installing birdhouses and insect hotels supports urban wildlife. These structures provide shelter and nesting sites, promoting a balanced ecosystem.

02



03

Environmental Workshops

Workshops on soil health and composting reduce campus waste by 30%. Students gain practical skills that they can apply to their daily lives and communities.

Urban Youth Engagement Program



- **BioBlitz Events**

Partnering with Harbin' s public schools to integrate nature into curricula.

Students document urban species using iNaturalist, discovering over 200 species in city parks.

- **Nature Art Projects**

Combining science and creativity to visualize ecosystem services like clean air and pollination.

These projects make complex environmental concepts accessible and engaging.

- **Community Influence**

Children become ambassadors for urban biodiversity, influencing family habits like reducing plastic use.

Their enthusiasm and knowledge inspire positive changes in their households.



Community-Led Wetland Restoration

STEP. 01

Revitalizing Urban Wetlands

Revitalizing degraded urban wetlands in collaboration with local residents. Training volunteers in water quality monitoring and invasive species management.

STEP. 02

Nature Festivals

Hosting 'Nature Festivals' to celebrate restored habitats, attracting 5,000+ visitors annually. These events raise public awareness and support for conservation efforts.

STEP .03

Policy Impact

Improved water ecosystems lead to increased public support for conservation policies. Community involvement strengthens the case for sustainable urban development.



PART 3

Challenges and Innovative Solutions

Addressing Space Constraints



Limited Green Areas

Dense cities face limited green areas, a significant challenge for natural education. Space constraints restrict the availability of natural learning environments.



Repurposing Lots

Repurposing abandoned lots into green spaces provides additional areas for natural education. Transforming neglected areas into vibrant ecosystems benefits both people and wildlife.



Vertical Gardens

Vertical gardens and micro- forests (e.g., Miyawaki method) maximize limited space. These innovative solutions create green oases in urban areas.



Overcoming Engagement Barriers

Competing Priorities

Competing priorities like screen time and academic pressure hinder engagement in natural education.

Modern lifestyles often leave little room for outdoor activities.



Family Involvement

Involving families in natural education activities ensures broader participation.

Family- friendly programs encourage parents and children to learn together.



Gamified Learning

Gamified learning apps (e.g., Pokémon GO- inspired biodiversity quests) make natural education fun and engaging. These apps use technology to attract young people to explore urban biodiversity.

Bridging Policy Gaps

Lack of Institutional Support

A lack of institutional support for nature- based curricula is a major policy gap.

Educational institutions often prioritize traditional subjects over environmental education.

Advocacy for ESD Framework

Advocating for UNESCO' s Education for Sustainable Development framework in national policies can drive change. This framework emphasizes the importance of integrating sustainability into education systems.

Community Partnerships

Building partnerships with community organizations ensures that natural education initiatives have local support.

These collaborations help tailor programs to meet community needs and priorities.





Leveraging Technology

01 Augmented Reality

Augmented reality (AR) tools visualize “hidden” urban ecosystems like underground root networks.

AR enhances the learning experience by making invisible natural processes visible.

02 Citizen Science Platforms

Citizen science platforms like eBird crowdsource biodiversity data.

These platforms engage the public in scientific research, fostering a sense of ownership and responsibility.

03 Smart Monitoring

Smart monitoring systems provide real- time data on forest health and pest activity.

These technologies enable more effective management and protection of natural areas.



PART 4

Northeast Forestry University's Contributions

Natural Education Bases



Maoershan Experimental Forest Station

Establishing natural education bases in Maoershan Experimental Forest Station. Field- based learning allows students to study forest health, biodiversity conservation, and pest control techniques.

Liangshui National Nature Reserve

At Liangshui Reserve, students explore cold- temperate coniferous ecosystems. Research focuses on climate regulation and soil conservation, reinforcing the value of natural habitats.

Ma Yongshun Forest Farm

At Ma Yongshun Forest Farm, students engage with veteran forestry workers. They learn about reforestation efforts and the harmonious coexistence between humans and nature.

Urban Biodiversity Conservation



Habitat Restoration

Collaborating with urban forestry demonstration bases to restore urban green spaces.

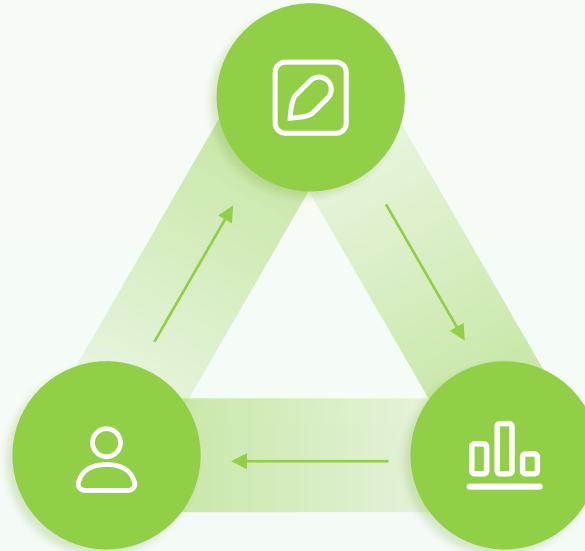
Research on native species like Manchurian ash and Amur cork tree supports biodiversity.



Ecological Corridors

Developing ecological corridors to connect fragmented habitats.

These corridors facilitate the movement of species and enhance urban biodiversity.



Public Engagement

Hosting workshops and citizen science programs to raise awareness about urban wildlife.

These initiatives encourage public participation in conservation efforts.

Under-Forest Economy

Multi-Layered Plantation Management

Implementing multi-layered plantation management techniques at Maoershan and Lao Mountain Experimental Stations. Mixed forests optimize ecological and economic benefits, supporting sustainable forestry.

Non-Timber Forest Products

Promoting understory crops like medicinal herbs and edible fungi. These products reduce reliance on timber harvesting while boosting local livelihoods.

Sustainable Timber Production

Studying experimental plots to enhance biodiversity and sustainable timber production. Innovative practices ensure that forests remain healthy and productive.



Eco-Friendly Innovations



Smart Monitoring Systems

Developing smart monitoring systems for real-time forest health assessment.

01

Grid- based pest monitoring and IoT- enabled devices improve forest management.



Biomaterial Research

The Key Laboratory of Forest Plant Ecology develops eco- friendly materials.

02

Biodegradable composites from forest resources reduce environmental impact.



Technology Integration

Integrating technology into natural education enhances learning and conservation efforts. Innovative tools make complex environmental concepts more accessible.

03

Forest Museum as an Educational Hub



China (Harbin) Forest Museum

The museum houses over 30,000 specimens, including ancient fossils and wildlife dioramas.

Exhibits showcase human- forest interactions throughout history.



Interactive Displays

Interactive displays on forest carbon sinks and biodiversity conservation engage visitors.

The museum serves as a platform for students and the public to learn about sustainable coexistence.



Educational Programs

The museum hosts educational programs that complement classroom learning.

These programs provide hands- on experiences that deepen understanding of forest ecosystems.

Global Collaboration



01

International Partnerships

Partnering with institutions like the University of Auckland and Aston University.

These collaborations advance research in agroforestry and carbon neutrality.

02

Carbon Neutrality Institute

Establishing the Carbon Neutrality Institute to focus on forest carbon sink enhancement.

The institute develops eco-product certification systems to promote sustainable practices.

03

Global Impact

Northeast Forestry University's initiatives contribute to global sustainability goals.

The university's research and programs have a far-reaching impact on environmental conservation.





PART 5

Conclusion and Call to Action

Final Message



Necessity of Natural Education

Natural education is essential for survival, not a luxury.

It nurtures a generation that values biodiversity and promotes sustainable development.



Transforming Cities

By integrating natural education, we can transform cities into thriving ecosystems.

Cities can become places where humans and nature coexist harmoniously.



Securing the Future

Securing the health of our cities ensures the future of our planet.

Natural education plays a vital role in achieving this goal.

Call to Action



STEP. 01

Integrate Natural Education

Integrate natural education into all levels of formal and informal learning. Ensure that everyone has access to environmental education.



STEP. 02

Innovate with Technology

Innovate with technology and community-driven solutions. Use modern tools to enhance natural education and conservation efforts.



STEP .03

Invest in Green Spaces

Invest in policies that prioritize green spaces as vital urban infrastructure. Recognize the importance of green areas for human well-being and biodiversity.

Closing Remarks



Collective Responsibility

We all have a responsibility to protect our environment.

Natural education empowers us to take informed and effective action.



Inspiring Change

Let us inspire change by integrating natural education into our lives and communities.

Together, we can create a sustainable future for all.



Thank you for your attention!

