

Review based on Human well-being, biodiversity and mental health

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Abstract -- The variety of organisms on Earth, or biodiversity, supports human and social needs such as the security of food and nutrition, energy, the creation of pharmaceuticals and medications, and freshwater, which collectively are essential to good health. Additionally, it promotes employment possibilities and recreational pursuits that enhance general well-being. However, recent findings point to the possibility that ecological diversity may also be significantly related to the mental health and wellbeing of people. By examining recent research that has looked at the association between exposure to nature, biodiversity, and mental health outcomes, this review paper seeks to explore the relationship between biodiversity and mental health. According to the biodiversity theory, the natural environment has a favorable impact on the mental and physical well-being of people. In conclusion, this review article emphasizes the value of biodiversity for human well-being and calls for more study, action, and protection of nature for the betterment of human mental health.

Index Terms -- Biodiversity, biophilia, mental health, nature, well-being.

INTRODUCTION

What effects does biodiversity have on people's health? In the end, ecosystem services and products (such as the availability of clean water, food, and fuel sources) are what determine human health and productivity. Additionally, the biological diversity of microbes, plants, and animals has significant advantages for the fields of biology, medicine, and pharmacology. [1]

Disease prevention is aided by biodiversity. Human health has been shown to grow as biodiversity levels rise. The human and financial costs of mental disorders are rising on a global scale. Over 450 million individuals worldwide are believed to be affected by mental illness [2]. We are gradually becoming more conscious of how environmental problems like climate

change and biodiversity loss affect human health as the rate and expenditures of mental illness rise. Recent research has shown that environmental disasters and environmental degradation have a negative impact on psychological outcomes.

THEORIES OF BIODIVERSITY

There are three fundamental theories (developed in the 80's last century), which try to explain the positive effect on mental health of being in contact with nature:

A. Biophilia: Biodiversity & Mental Health

According to the biophilia idea, humans have a natural attraction for and connection to nature, and this connection is crucial for maintaining our physical, emotional, and mental well-being. Edward O. Wilson, a biologist, first put forth this hypothesis in the 1980s. Since then, it has acquired significant acceptance and endorsement from academics working in fields that include mental health, ecology, and healthcare. [3]

1. Biophilia and Biodiversity:

According to the biophilia theory, humans evolved to be both physiologically and mentally reliant on their surroundings. Our species has a long record of coexisting closely with the environment, and our biological systems have been modified to prosper there. [4] Biophilia contends that the environment, or the diversity of life forms in ecological systems, has a direct bearing on human well-being. Biodiversity is a fundamental aspect of nature.

2. Biophilia and Mental Health:

Exposure to nature and biodiversity has a wide range of beneficial effects on mental health and wellbeing, according to research. Time spent in natural settings has been associated with lowered stress, a greater mood, improved cognitive function, and increased creativity. The treatment of mental health conditions like anxiety, depression, and Attention Deficit Hyperactivity Disorder (ADHD) has been demonstrated to be successful when using nature-

based approaches, such as ecotherapy and wilderness therapy. [5] Natural habitats, with their sensory variety and rich stimuli, encourage rest and repair, lower stress levels, and enhance mental health. [6]

B. Attention-Restoration

This theory is based on the works of US psychologist W James at the end of the 19th century. According to this theory, in all individuals there are two areas of mental attention,

1. Intentional and voluntary direct attention, in which one focuses on elements deemed significant to oneself. Direct attention fatigue, or DAF, is the result of having to focus on distractions that are less significant and must be blocked by the mind.
2. Indirect attention, also known as fascination, which is automatic and involuntary and maintains focus with little to no effort. This enables the brain to replenish itself before returning to focused attention [7].

The right frontal cortex of the brain houses the attention-restoration mechanism. From an evolutionary perspective, survival depended on being awake and focused. The best surroundings for recuperation are those that provide time apart from regular routines as well as opportunities for enjoyment and wonder.

Rachel and Stephen Kaplan proposed the Attention Restoration Hypothesis (ART), a psychology hypothesis that contends that contact with nature, including ecosystems, can have a restorative impact on mental functioning, particularly attention and cognitive ability. According to the hypothesis, whereas urban settings, which are characterized by constant stimulation and attention-demanding tasks, might result in mental exhaustion and cognitive decline, natural settings, which are abundant in biodiversity, can aid in the replenishment of cognitive resources and the restoration of mental well-being. [8] Environments that are healing: According to ART, environments with lots of biodiversity offer a special chance for mental healing. Many different sensory cues, such as the sight and sound of birds, the aroma of flowers, and the feel of natural textures, are frequently found in biodiverse ecosystems. [9] The focus of Restoration Theory postulates that interacting with biodiverse habitats may have a restorative impact on one's mental health by easing stress, regaining focus, and enhancing psychological well-being in

general. According to this hypothesis, maintaining and fostering ecological diversity in our environment's habitats can help improve mental health and overall wellbeing.

C. Psycho-physiologic stress recovery. -

This idea is based on empirical findings, specifically the favourable responses people exposed to natural settings gave. In accordance with this hypothesis, a natural selection element that raised the likelihood of survival was the evolutionary-based capacity of people to recover from a hazardous condition. [10]. The "fight or flight response" is a physiological pattern that people use to respond in stressful situations. The article "Biodiversity and Mental Health"

The term "biodiversity" describes the range of living things—including plants, animals, microbes, and ecosystems—that are present in a specific location. According to the psycho-physiologic stress recovery theory, exposure to a variety of natural settings with high levels of biodiversity can encourage stress reduction and recovery from stress-related symptoms, improving the state of one's mental health.

Overall, exposure to natural areas with high biodiversity can have a number of modes of action that support stress reduction, improved mental health, and general well-being, according to the psycho-physiologic stress recovery theory that relies on biodiversity and mental health. Promoting access to and inclusion of biodiversity-rich natural areas in daily life can be an approach to enhancing mental health and wellbeing in people and communities.

THE RELATIONSHIP BETWEEN BIODIVERSITY AND MENTAL HEALTH

Here are some key details about the relationship between biodiversity and mental health:

- Stress reduction: Stress-relieving effects of biodiversity on mental health Spending time in natural settings with a variety of plant and animal species, such as woods, parks, or other such settings, has been linked to lowered stress levels and enhanced mental wellbeing [11].
- Biophilia hypothesis: According to the biophilia hypothesis, interaction with biodiversity can improve mental health, and humans

have an innate attraction towards nature as well as other living things. [12]

• Cultural ecosystem services:

By offering chances for relaxation, enjoyment, and connection with nature, hobbies like hiking, birdwatching, or gardening, which permit meaningful interactions with biodiversity, can help enhance mental health outcomes. [13] Loss of biodiversity and deterioration of ecosystems.

On the other side, issues including habitat destruction, climate change, pollution, and invasive species can have a negative impact on mental health and lead to ecosystem degradation and biodiversity loss. Reduced opportunities to interact with nature and limited access to biodiverse natural areas can lead to higher levels of anxiety, depression, and stress, as well as lower overall wellbeing. [14]

In conclusion, there is evidence that suggests that exposure to biodiversity can improve mental health and well-being, but that the relationship between biodiversity and mental health is complex and nuanced.

METHODS USE IN BIODIVERSITY AND MENTAL HEALTH

Biodiversity and mental health are interconnected, and there are several methods that can be used to promote the well-being of both. Here are some methods that can be used to incorporate biodiversity into mental health practices:

1. Green space: Home gardens as a conceptual model of green space for biodiversity and mental wellness. The rationale for using a home garden or other green area to promote mental health is related to its "ecological medicine" benefits in lowering stress and mental health issues brought on by the inability to access green spaces and parks. [15]

• Health and Well-being Benefits:

Recreational and Physical Activity: Green areas provide chances for sports, cycling, walking, jogging, and other physical activity. They motivate people to exercise, raising general levels of fitness and lowering the risk of developing chronic illnesses. Spending time outside has been associated with a reduction in stress, anxiety, and depressive symptoms. The presence of greenery encourages relaxation, uplifts the spirit, and improves mental health. Green areas function as

gathering places for communities, promoting social contact, organising neighbourhood events, and creating a sense of community. [16].

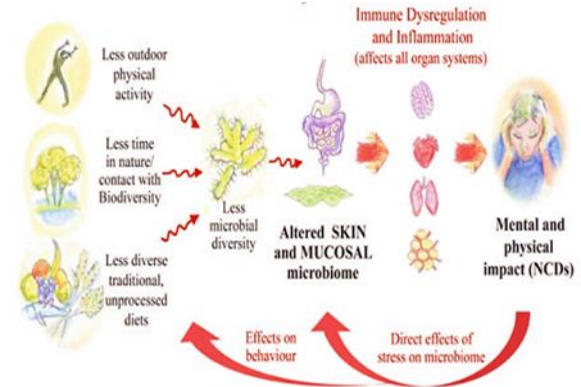


Fig.1 The inter-relationship between biodiversity and mental health

2. Nature-based therapies:

Spending time in natural settings to enhance mental health is a component of nature-based therapies, commonly referred to as ecotherapy or green therapy. This can involve doing things like gardening, hiking, or just relaxing in parks or forests. Studies have demonstrated that nature-based therapies can enhance general mental health by reducing stress, anxiety, and depression symptoms. The term "nature-based therapies," also referred to as "ecotherapy" or "green therapy," describes therapeutic approaches that make use of the natural world to advance one's mental, physical, and emotional well-being. [17]. These treatments take advantage of nature's healing properties by including outdoor locations such as gardens, parks, and other natural settings in the therapy process. The following information relates to nature-based therapies:

Types of Nature-Based Therapies:

1. Horticultural therapy involves engaging in gardening or plant-related activities to promote physical and mental well-being. It is often used in rehabilitation, mental health treatment, and working with individuals with disabilities. [18].
2. Wilderness Therapy: Involves immersive experiences in nature, typically in a wilderness setting, to promote personal growth, self-reflection, and self-discovery. It is often used for individuals struggling with mental health issues, addiction, or behavioral challenges. [19]
3. Animal-Assisted Therapy: Involves interactions with animals, such as equine therapy (with horses) or

therapy dogs, to improve social, emotional, or cognitive functioning. It is commonly used in various therapeutic settings, including mental health, rehabilitation, and special education. [20]

4. Nature walks and ecotherapy involve guided or self-guided walks in natural environments where individuals can engage with nature, practice mindfulness, and gain psychological benefits from being immersed in the natural world. [21]
5. Adventure Therapy: Combines outdoor activities, such as rock climbing, hiking, or kayaking, with therapeutic interventions to promote personal growth, teamwork, and self-confidence. [22]

Benefits:

Improved Mental Health: Nature-based therapies have positive effects on mental health, including reducing symptoms of depression, anxiety, and attention deficit hyperactivity disorder (ADHD). They can improve moods, boost self-esteem, and enhance overall psychological well-being.

3. Green exercise:

Exercise that is done outside, like jogging, walking, and bicycling in parks or other natural settings, is referred to as "green exercise." It has been demonstrated that green exercise enhances mental wellness. [23] Exercise that is done outside in a natural setting, such as a park, forest, garden, or other green area, is referred to as "green exercise." It combines the advantages of exercise with the advantages of spending time in nature. The following information on green exercise:

Types of Green Exercise:

1. Jogging or running in green places offers a low-impact type of exercise that people of all fitness levels can enjoy. It promotes general fitness, strengthens muscles, and enhances cardiovascular health.
2. Hiking and trail running: Exploring hiking routes or participating in trail runs in natural settings gives a hard workout as well as the chance to get in touch with nature and take in beautiful views.
3. Cycling: Cycling in open spaces like parks or the countryside mixes the delight of being outside with cardiovascular activity. It supports mental health, increases stamina, and strengthens the legs.
4. Outdoor sports offer a pleasant and active way to take in nature while enhancing physical fitness, coordination, and collaboration. Examples include

playing tennis, basketball, soccer, or frisbee in natural places.

5. Yoga and Tai Chi: Exercising in green areas helps people connect with nature, find peace, and develop flexibility, power, balance, and meditation. [24]

Benefits of Green Exercise:

Physical Fitness: Green exercise improves physical well-being by fostering cardiovascular health, boosting muscle strength, increasing flexibility, and improving overall physical condition.

Exercise in natural settings has been demonstrated to lower stress, anxiety, and depressive symptoms. Mental well-being and stress reduction It elevates mental health and wellbeing and uplifts self-esteem and mood. [25]

4. Conservation activities:

Activities that offer a feeling of meaning and connection to nature, such as habitat restoration, tree planting, and animal monitoring, can have a favourable effect on mental health. [26]

5. Nature-based mindfulness:

To promote relaxation, lessen tension, and increase mental clarity, mindfulness techniques can be used in natural settings, such as deep breathing or meditation. [27]

6. Education and awareness: It remain possible to encourage positive attitudes and actions towards nature by increasing understanding of the value of biodiversity and its relationship to mental health. [28]

RESEARCH STUDIES THAT HAVE EXPLORED THE RELATIONSHIP BETWEEN BIODIVERSITY AND MENTAL HEALTH

- **Biodiversity and Health: A Guide for Policymakers:** In this report, the World Health Organisation (WHO) and the Secretariat of the Convention on Biological Diversity (CBD) discuss the various ways that biodiversity can improve mental health, including by reducing stress, enhancing cognitive function, and fostering a sense of place and belonging.
- **Green Space and Mental Health: Pathways, Impacts, and Challenges":** This review study, which was written by several authors and appeared in the journal of Epidemiology and Community Health, explores the various ways that green spaces may improve mental health, such as

through reducing stress and encouraging physical exercise.

- Biodiversity as a Natural Resource for Mental Health: A Systematic Analysis of Biodiversity and Mental Health Outcomes" According to this systematic analysis, being among biodiverse areas like forests, gardens, and parks might help mental health in ways like lowering stress levels, elevating mood, and boosting wellbeing.

These are only a few illustrations of studies that looked into the connection between biodiversity and mental well-being. The evidence indicates that being in places with high biodiversity may benefit mental health.

ORGANIZATION

The international non-profit organisation Conservation International aims to save the environment for the benefit of all people.

1. The Nature Conservancy: The Nature Conservancy is an international conservation group that seeks to save the lands and rivers that are essential to all life. They have programmes that advocate for how nature may enhance mental health and wellbeing.
2. Worldwide Organisation for Health (WHO): A worldwide health organisation called the WHO is aware of the significance of mental health for overall wellbeing. The "Nature for Mental Health" campaign, which emphasises the advantages of nature for mental well-being and health, is one of their efforts to promote the significance of nature in mental health.
3. The Conservation Action Trust (CAT) is a group that seeks to protect India's natural resources, notably its biodiversity. They carry out studies and awareness campaigns on the value for biodiversity for human well-being, including mental well-being, and they support laws and practises that safeguard biodiversity while fostering mental health.

OPINION OF WHO ON RELATIONSHIP BETWEEN BIODIVERSITY AND MENTAL HEALTH

The World Health Organization (WHO) acknowledges the importance of research into the connection between biodiversity and mental health. The WHO acknowledges that having access to nature and biodiversity can improve mental health by

lowering stress, elevating mood, boosting physical exercise, and encouraging social interactions. Green spaces and other nature-based interventions, such as ecotherapy, have been demonstrated to improve mental health outcomes, including lowering symptoms of anxiety and sadness. To completely comprehend the intricate connection between biodiversity and mental health, it's crucial to keep in mind that this area of study is still developing. [29]

FUTURE BENEFITS TO STUDY THE RELATIONSHIP BETWEEN BIODIVERSITY AND MENTAL HEALTH

Studying the relationship between biodiversity and mental health can provide several benefits in the future, including:

1. Better mental health outcomes: By comprehending how biodiversity affects mental health, evidence-based interventions to increase mental well-being can be developed.
2. Sustainable urban planning: Cities that are designed with biodiversity considerations can have considerable advantages for mental health. Urbanisation is a global trend. [30]

CONCLUSION

Consequently, research on the connection between biodiversity and mental health has the potential to yield a variety of advantages in the future, including better mental health outcomes, environmentally friendly urban planning, conservation initiatives, health promotion, and financial advantages.

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