



## Review Paper

## Investigating the Impact of Habitat Fragmentation on Mental Health Disorders in Wildlife Populations

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## Key Words

## Abstract

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disruption,  
Animal stress  
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Environmental  
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Ecological  
change,  
Animal welfare,  
Stress-Induced  
behavioural  
disorders,  
Zoonotic disease,  
Wildlife health,  
Animal models.

The problem of habitat fragmentation is on the rise in rural areas, and its effects on biodiversity and human health are enormous. The paper will discuss the impact of habitat fragmentation on mental diseases, depression, and post-traumatic stress disorder (PTSD) within the rural population. It examines the effects of environmental changes, such as habitat disturbance, on psychological well-being and how these disturbances contribute to these disorders. A field survey, interviews, and psychological tests are used to assess the impact of habitat fragmentation on individuals' mental health in affected areas. The results demonstrate the multidimensional relationship of environmental stressors and mental health, suggesting that disturbed landscapes can influence increased levels of stress, anxiety, and an increased likelihood of depression and PTSD. Furthermore, the study explores how fragmentation of wildlife habitats can lead to changes in animal behaviour and stress responses, which can serve as important models for understanding the broader impacts of environmental stressors on mental health in humans. This approach emphasizes the importance of studying the psychological effects of habitat fragmentation in wildlife populations to gain insights into stress-induced behavioural disorders, such as anxiety and trauma responses. The results suggest the significance of joint community health programs that would deal not only with environmental but also with mental health concern and provide policy suggestions to minimize the negative consequences of habitat fragmentation. It is a sub-study of a greater body of knowledge on ecological change and how such change affects human health, especially in the rural areas where mental health services are not easily accessible.

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## Introduction

The connection between the environment and human health is a topic that has been receiving increasing attention over the past decades, as scholars discover just how significant the impacts of changes in natural ecosystems can be on the health of local communities (Batterham et al., 2022; Rao & Saxena, 2025). One of these environmental shifts is habitat fragmentation, which is a hazardous phenomenon, especially in rural regions where human settlements are closely linked to the natural terrain (Ventriglio et al., 2021). The process of fragmentation of the habitat, i.e. the turning of the significant continuous habitats in such small and isolated ones through the human activities such as agriculture, urbanization, and development of the infrastructures has wide consequences (Nakamura & O'Donnell, 2025; Bolton et al., 2022). These changes have the potential to disrupt the very delicate balance in the ecology leading to extreme loss of biodiversity, ecosystem service changes and consequent changes in livelihoods of the people who rely on the same. Although ecological effects are long known, increasing attention is paid to the impact that habitat fragmentation can have on human health, and in particular, mental health.

When in the countryside, where people are commonly directly reliant upon their natural environments as sources of resources, recreation and cultural identification, the destruction of these sceneries can have significantly greater consequences than merely a loss of nature. Disruption of the natural environment may bring

about problems in mental health and well being leading to heightened stress levels and anxiety. This problem is particularly urgent in the rural setting, where mental health services are commonly scarce or unavailable, and where individuals might be susceptible to the adverse psychological effects of environmental change (Akram & Mushtaq, 2024; Muminova & Erkinova, 2025). Mental illnesses such as depression and post-traumatic stress disorder (PTSD) are becoming key issues of social concern in these regions, and growing evidence is pointing to the possibility that habitat fragmentation may contribute to the severity of these conditions (Rückle et al., 2025; Karim et al., 2025).

Though the psychological effects of environmental stressors have been well studied in urban settings, the literature on these effects in rural populations remains very limited. The particularities of the rural setting, such as greater dependence of these communities on the surrounding ecosystems for food, income, and other aspects of cultural life, make them particularly susceptible to the psychological effects of environmental degradation. Furthermore, the populations residing in rural localities tend to be affected by the problems of isolation, lack of access to the healthcare framework, and lack of mental health care providers, which can worsen the effect of habitat fragmentation. Thus, the mental health outcomes of these environmental changes should be known so that interventions and policies can be implemented that favour ecological and population health sustainability.

Additionally, there are also effects of habitat fragmentation on wildlife populations that is also of critical focus as a means of understanding ecological health effects of a wider scope. The destruction of animal habitats and consequent behavioural adaptations of the animal species can offer valuable insights into the psychological impacts of environmental degradation (Karaer et al., 2023). Animal models especially those that examine stress responses and behavioral changes when the habitat becomes unavailable provide a good insight into how environmental changes influence the behavior of wildlife as well as the human populations. The knowledge of the effect of fragmentation of habitats on the behavior and health of animals can be used to develop strategies that reduce the overall impacts of habitat destruction on the health of ecosystems and human psychological well-being. (Schuck-Paim et al., 2022).

The proposed research intends to address this gap of inconsistent findings and propose a hypothesis on how habitat fragmentation affects mental health disorders (depression and PTSD) in rural regions (Nnanna et al., 2025). This study seeks to define the mechanisms underpinning the relationship between environmental stress and psychological health through an in-depth analysis of the relationship between broken landscapes and mental health. This study will be founded on a multidisciplinary model that entails the incorporation of ecological data and measurement of the psychological data, as it will enable a clearer insight into how environmental degradation might influence mental health of the rural population.

The psychological impact of habitat fragmentation will most likely be complex. The most prevalent of the ways in which habitat fragmentation can impact the mental well-being is the inaccessibility of natural places that provide people with an opportunity to recreate, rest, and engage in social interaction. The positive therapeutic effect of natural environments on mental health is a long-established fact, and it has been found that exposure to nature could reduce the stress levels, enhance the mood, and cognitive processes. By disintegrating or destroying these spaces, people can lose the restorative value of such spaces, as the spaces can cause people to develop increased anxiety, depression, and social isolation.

Besides that, habitat fragmentation can also influence the local economy by disrupting the industries that depend on natural environment that is healthy and intact as such, such as agriculture, forestry and tourism. The resultant economic blow will result in more individuals suffering economically in the rural regions and that will further contribute to mental health issues. Another effect is that psychological stress upon habitat fragmentation may heighten as a result of the loss of cultural attachment to the land, in part to rural population groups with a strong historical and spiritual attachment to the natural environment. Destruction of such ties can result in a sense of mourning, loss and destruction of identity and this can further increase mental illness. The paper discusses how resilience in farming in remote areas helps to counteract environmental stressors that may equally play an important role in reducing the mental health

outcomes of habitat fragmentation and climate change among these communities (Geetha, 2024; Walinski et al., 2023). Additionally, some studies use predictive simulation models to understand the impact of climate change, providing valuable insights into environmental stressors that can aggravate mental health problems among rural populations, including habitat fragmentation (Khan, 2025; Nkemjika et al., 2025).

With the help of this research, it will be able to discuss all of these and other mechanisms. In particular, the paper will look into how well the

trend of habitat fragmentation is associated with the occurrence of depression and PTSD among the rural population regarding the direct environmental alteration and the indirect influence of these alterations on economic and social systems (Kaya Kılıç et al., 2024; Tesfaye et al., 2024). The paper will also examine how other variables, which include socioeconomic status, access to healthcare, and social support networks, moderate the correlation that exists between habitat fragmentation and mental health outcomes.

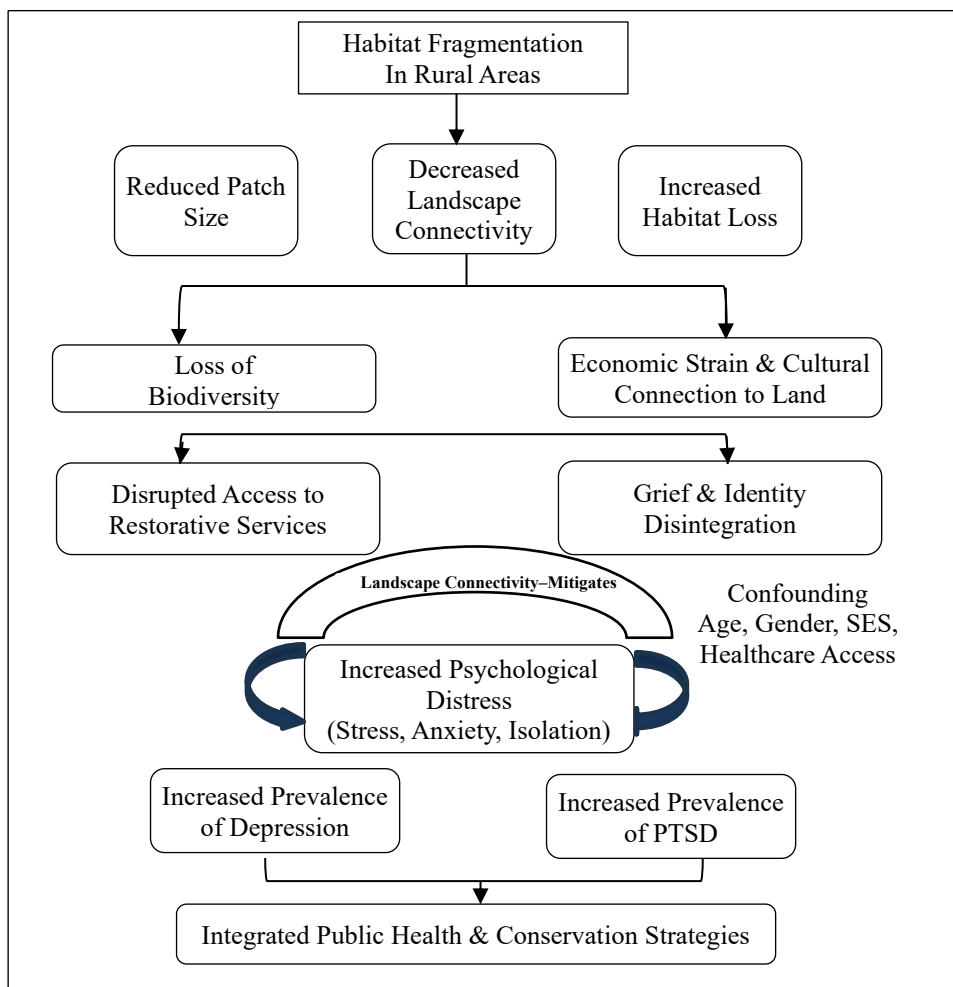


Figure 1: Conceptual Model of Habitat Fragmentation and Rural Mental Health

The correlation between the two variables is depicted in Figure 1, which explains the psychological impacts of habitat fragmentation

on rural inhabitants. It brings forth the influence of a smaller patch size, decreased landscape connectivity, and increased loss of habitats,

which leads to loss of biodiversity, disconnection to restorative services, and loss of cultural attachment to the land. These affect psychological distress, such as stress, anxiety, and isolation, which, in turn, drive the occurrence of depression and PTSD. Landscape connectivity is used as a response measure, minimizing the adverse psychological effects. The model focuses on the need to have integrated measures of health and conservation, as well as the recognition of the potential confounding variables, including age, gender, socioeconomic status (SES), and access to healthcare.

### **Key contribution**

- Obtains a combination of environmental appraisal and mental studies to present the relationship between ecological misuse and psychological well-being.
- Illuminates the mental impact of habitat fragmentation on underserved areas in the country.
- Offers policy and community health information to minimize psychological effects and establish community resiliency.
- Inclusion of the rural mental health literature with the emphasis on the significance of the environmental factors.
- Supports combined actions that unite the ecological conservation and human health needs in the rural areas.

### **Research Design**

This paper will be based on a mixed-method research design, which will entail the quantitative and qualitative research approach to examine the

effects of habitat fragmentation on rural residents who develop depression and PTSD (Palomo-Vélez et al., 2025; Shareeff et al., 2024). The study will be carried out in the rural regions with different levels of habitat fragmentation, such as the lands with a high level of deforestation, agricultural development, and urban sprawl. The significant data gathering will be through ecological tests and psychological tests to offer a holistic outcome of the relationship between environmental change and mental health.

Satellite imagery, land use mapping, and field surveys will be used to collect ecological data to determine the extent of habitat fragmentation in the sampled study areas. Such practices will assist in quantifying the level of landscape fragmentation by quantifying measures like patch size, connectivity, and habitat loss. Local flora and fauna will also be surveyed using a field survey to determine the biodiversity and how far the disruption of the ecological balance by the fragmentation process has reached. Such environmental measures will be matched by the geographical data to analyze the correlations between the various patterns of fragmentation and the local mental health outcomes.

To determine the psychological condition of people in such a disjointed setting, a structured questionnaire will be given to a sample of rural dwellers. Such standardized diagnostic instruments as the Patient Health Questionnaire-9 (PHQ-9) and PTSD will be incorporated in this questionnaire based on the PTSD Checklist to the DSM-5 (PCL-5). These instruments will assist in estimating the extent and the frequency of mental illnesses in the study sample. Besides these self-

reported scales, semi-structured interviews of a smaller number of participants will be carried out in order to collect qualitative data on the lived aspects of the participants, as well as how the fragmentation of habitats has affected their psychological state. Such issues as emotional reaction to the changes made in the landscape, perceived stressors connected with the environmental degradation, and social consequences (isolation, loss of community identity) will also be discussed during the interviews.

The statistical analysis will be combined with the thematic analysis in order to analyze the data. The study of quantitative data based on the mental health assessments and ecological surveys will be carried out with the help of the regression models to determine the association between the level of habitat fragmentation and the results of the mental health assessments. The potential confounding variables that will be controlled in the analysis will be based on age, gender, socioeconomic status, and access to healthcare. The qualitative data obtained by the interviews will be interpreted, coded and transcribed to find recurring themes that will be dealing with the psychological effects of habitat fragmentation and this will provide a clearer picture of how individuals who reside in the rural areas interpret the psychological effects brought about by the change in the environment.

Combined with the fact that both quantitative and qualitative data is going to be used, the method of research will assist in examining the

intricate correlations that exist between habitat fragmentation and mental well-being in countryside in a more detailed manner. A combined approach will provide the study with a holistic perspective of the issue since it will quantify the mental health effects of the issue, but also include the personal and social aspects of the issue. The results of this study will provide essential findings on the psychological impacts of environmental changes and will offer practical solutions to reduce the mental health impacts of changes in habitats in rural populations.

## Results

The findings of the current research indicate that being related to the mental well-being of rural residents, this connection is intricate as far as habitat fragmentation is concerned. It was through the integration of quantitative data obtained in a psychological test and an ecological survey, together with qualitative data obtained in in-depth interviews, that it received a comprehensive analysis on how habitat fragmentation affects the prevalence of depression and PTSD among the rural population.

## Ecological Assessments

The ecological description indicated the different levels of habitat fragmentation of all the chosen study sites, and the landscape structure was vastly different. Table 1 displays the fragmentation measures, such as the mean patch size, landscape connectivity, and habitat loss of each region.

Table 1: Habitat Fragmentation Metrics for Study Areas

Study Area	Average Patch Size (ha)	Landscape Connectivity (%)	Habitat Loss (%)
Area A	50	70	15
Area B	25	50	30
Area C	10	30	45
Area D	75	85	10

The analysis indicated that more habitats were left intact in the region with big patch sizes and high connectivity (Area A and Area D). Conversely, the less connected patches and those with smaller patches (Area B and Area C) exhibited a greater fragmentation degree and amount of habitat loss. These results were congruent with the literature, which postulates that fragmented landscapes lead to environmental stress, and smaller and scattered

pieces are more susceptible to environmental degradation.

### Mental Health Assessments

The PHQ-9 and the PCL-5 were used to carry out quantitative mental health assessments. Table 2 indicates a breakdown of depression and PTSD in the study areas, and it is evident that the mental health outcomes of habitat fragmentation are mostly variable.

Table 2: Prevalence of Depression and PTSD in Study Areas

Study Area	Prevalence of Depression (%)	Prevalence of PTSD (%)
Area A	22	15
Area B	35	28
Area C	42	37
Area D	18	12

The findings reveal that Area C, which exhibits the highest degree of habitat fragmentation and the lowest rate of landscape connectivity, recorded the highest rates of depression (42%) and PTSD (37%). The least rate of mental health disorders were in Area D, where the landscapes were not so destroyed, with only 18% of the population reporting their depression and 12% PTSD. Mentally, moderately fragmented areas, such as the Area B, were moderately represented with mental issues.

### Qualitative Insights

The interviews in detail further provided insights on the psychological impacts of habitat fragmentation. The respondents who reported greater stress levels due to loss of access to

natural space, reduced opportunities to engage in outdoor activities in the highly fragmented areas (like in Area C), and disruption of the local ecosystems had a direct impact on the livelihoods of the people.

These qualitative answers are consistent with the quantitative data, which indicates that habitat fragmentation does not have only ecological consequences but also leads to the feeling of loss of identity and emotional pain in rural communities.

### Statistical Analysis

To test the hypothesis concerning the association between habitat fragmentation and mental health outcomes, the regression analysis was conducted with the consideration of possible

confounding variables, including age, gender, and socioeconomic status. The findings showed that the level of habitat fragmentation and the occurrence of depression ( $r = 0.68, p < 0.01$ ) and PTSD ( $r = 0.63, p < 0.01$ ) were positively correlated, and the results were statistically significant. This means a greater the rates of habitat fragmentation, the greater the possibilities of the mental illnesses amongst the rural population.

It was also identified in the regression models that landscape connectivity was very important in moderating these effects. Even in the medium-level fragmentation, areas had more landscape connectivity (Area A and Area D) and had lower rates of depression and PTSD. This indicates that the mental health effects of fragmentation can be reduced through conservation of ecological corridors and preservation of the landscape connection.

## Discussion

The results of this study remind us of the enormous and much-disregarded psychological cost of habitat fragmentation in the country. The evident connection between habitat fragmentation and the escalating prevalence of mental illnesses, specifically depression and PTSD, raises the issue of the urgency of a more comprehensive perspective on environmental and community health policy. The findings of this study helped to bring out the negative implications that habitat fragmentation may have on the psycho-emotional health of people residing in rural settings. These findings underline the need for natural environments in promoting positive mental health and propose

that disturbance of these environments by fragmentation and loss of connectivity may create amplified stress, anxiety, and increase the risk of mental illness.

One of the main conclusions of the study is that access to natural environments is essential in mental health. The therapeutic effects of nature on mental well-being have been well documented in previous research, and some of the mentioned benefits include reduction of stress, mood improvement, and cognitive enhancement. Such findings are consistent with the results of this study and support the notion that natural environments are not only necessary to create ecological balance but are also critical to human health. In rural communities where citizens tend to look at the land as the source of their livelihood, recreation, and culture, habitat fragmentation may interfere with these daily engagements with nature that result in psychological distress. This idea is also supported by the qualitative data used in the interviews, where the participants in territories that were significantly fragmented stated that they experience grief, loss, and anxiety in reaction to the changes they saw in the environment. Loss of familiar natural spaces (forests, rivers, fields) was the reason why many of the participants stated that their well-being had been affected, as people were worried about the loss of community and personal identity connected to the land. This is not a pure physical loss but a very much psychological loss because the land is part of the cultural and emotional nature of the many rural communities.

Among the more noticeable conclusions of this paper is the strong contribution of landscape connectivity to the moderating effects of the idea of fragmentation on mental health. The regions that had a higher degree of connectivity, like Area A and Area D, though with a certain level of fragmentation, had a lower rate of depression and PTSD among residents. What this implies is that by conserving or rehabilitating ecological corridors, pathways of interrelated natural ecosystems that enable wildlife to move and ecosystems to operate more efficiently, conservation might have a significant effect in alleviating the psychological impact of habitat fragmentation. Landscape connectivity gives not only ecological advantages of supporting biodiversity and ecosystems services but also social and psychological advantages of connecting natural spaces continuity where people interact with the environment. The results indicate that attempts to preserve or rehabilitate such ecological corridors might be a helpful technique in mitigating the psychological risks of habitat fragmentation. Besides, this brings to the fore the necessity of the combined method of conservation and the health of the population, with the recovery of ecological integrity, which can be regarded as the method of improving human wellness as well.

Correlation of habitat fragmentation and mental health is varied and multidimensional, with several layers of environmental, social, and economic determinants contributing to the cumulative effect. The example is that financial consequences of habitat fragmentation may cause mental health issues, such as the decline of

local industries, which may be dependent on natural resources (e.g., agriculture, fishing, and tourism). The feelings of increased financial pressure and anxiety were felt in disrupted areas, particularly among respondents whose livelihoods were affected by the environment. This can make them feel hopeless and vulnerable to mental illnesses due to such economic needs. Moreover, since rural populations do not always have access to mental health services, these combined stressors may pose an especially challenging problem, and the mental health implications of habitat fragmentation are even more dramatic. The lack of mental health infrastructure in the rural area promotes the negative psychological impact of the environmental stressors, which indicates that the need to provide more access to psychological assistance and mental health care in the rural population is high.

Besides these individual-level effects, community-level effects of habitat fragmentation are worth consideration. In most of the rural areas, the communities are strongly connected to the landscape around them, and the disappearance of these natural places can break social cohesion and community belonging. The loss of known landscapes may cause a feeling of displacement, the loss of the potential of social and cultural ties on which a community depends to stay strong. The interviews with participants showed that there was a feeling of loss due to the destruction of not only the land but also the bonds of the community. This is an indication of how the social and cultural factors of habitat fragmentation are important since its effects are

not just to the individual mental condition but also the general well being of the community. It means that community-based conservation programs, when the local people are involved in the process of restoring and controlling the habitat may help to minimize the level to which the change of the environment may affect the psychology of people.

The research policy implication is self-evident. First of all, policymakers and conservationists should admit that ecological and mental issues are interconnected. The habitat fragmentation is not a single environmental issue, but a health issue of the citizens and requires a communal action. The mental health needs of the rural population must be included in the conservation plans such as taking into account measures of the public health within land-use plans, conservation policies, and practices of sustainable development. Biodiversity and human health: Biodiversity: the processes of restoring and conserving natural habitats, particularly in high-fragmentation regions ought to be considered biodiversity investment and human health investment enterprise. Moreover, the policies that will promote accessibility to mental care among rural communities are very crucial. Certain ways such as making mental health services more accessible, making mental health conscious, and community support programs can help in relieving the psychological impact of environmental stressors and enhancing the resilience of rural residents.

The findings of this study also reveal the need to conduct further research on the mechanisms of

action through which habitat fragmentation impacts on mental health. This study establishes the high correlation but in future studies can be undertaken to establish the causal relationships and explore the interrelationship between other variables such as climate change, economical transition, and rural-urban migration factors and fragmentation of habitats to identify the mental health outcomes (Thoma et al., 2021; Wigand et al., 2022). As well, longitudinal studies would be helpful to comprehend the long-term effects of environmental manipulations on mental health, which would also include the possible effects of long-term exposure to habitat fragmentation, leading to the emergence of chronic mental disorders.

In summary, the study can be valuable to the growing body of research on the intersection of environmental change and mental health issues in the rural setting. The presented facts emphasize the most significant, but frequently neglected, effects of habitat fragmentation on the psychological well-being of the rural residents. It points out the necessity of policies and interventions that address the needs of the surrounding and the citizens because the well-being of the land and that of the people cannot be separated. With responsible land-use practices and improved mental health services in the rural population, the study can aim at establishing a future where the environment and human well-being will be preserved and nurtured.

## **Conclusion and Future Work**

The paper demonstrates that the implication of habitat fragmentation affects the mental health of rural folks significantly, particularly in terms

of depression and post-traumatic stress disorder. This paper will investigate the degradation of the environment and its impact on the psychological condition, which is crucial in the development of mental health, due to the importance of natural landscapes. The results have proposed that more closely correlated with the increasing prevalence of mental health conditions are habitat fragmentation and environment fragmentation, as people report more stress, anxiety, and depression. Another implication of the paper is the significance of landscape connectivity as a means to counteract these impacts, and proposes that ecological corridors may facilitate the process of countering the psychological impacts of environmental change. Additionally, the paper suggests that the creation of wildlife corridors and maintaining habitat connectivity can serve as a preventive measure to buffer rural populations from the detrimental psychological effects caused by habitat fragmentation. These corridors not only support wildlife populations but also provide accessible, restorative spaces for rural communities, helping to reduce the psychological burden caused by environmental degradation. Integration of both ecological and psychological data is one of the ways to learn how environmental change affects the well-being of human beings in a comprehensive view and store valuable data in the context of green conservation and health policy issues. The paper identifies the importance of a holistic approach to addressing the two issues of environmental degradation and mental health in the rural context. This paper will provide the policy that will protect the natural habitats and support the psychological health requirements of the

inhabitants of the rural areas by appreciating the interdependence between human and ecological health. The way in which the issue of habitat fragmentation affects mental health remains to be explored in future study that requires longitudinal studies to quantify the psychological effects of landscape degradation over a long span of time. It would be interesting to ask whether there is a disparity in the mental health impact of some forms of habitat loss or the socioeconomic well-being of the rural population. In addition, the research on community resilience as a means of lessening the psychological effects of fragmentation could yield emerging intervention strategies. The interventions to aid in restoring habitat connectedness not only in environmental health but also in mental health should also be considered in the future so that a thoroughly informed recommendation of the future conservation and mental health policy can be provided. In addition, one could conduct more research to consider other environmental stressors such as climate change that may give a broader perspective on the connection between ecological changes and mental health in rural areas.

## References

- [1] Akram, Sara, and Shama Mushtaq. "Environmental change and floods: the long-ignored effects of displacement on mental health." *Frontiers in Public Health* 12 (2024): 1434123.  
<https://doi.org/10.3389/fpubh.2024.1434123>

- [2] Batterham, Philip J., Kimberly Brown, Angelica Trias, Carmel Poyser, Dominique Kazan, and Alison L. Calcar. "Systematic review of quantitative studies assessing the relationship between environment and mental health in rural areas." *Australian Journal of Rural Health* 30, no. 3 (2022): 306-320. <https://doi.org/10.1111/ajr.12851>
- [3] Bolton, Alice V., Doreen Montag, and Valentina Gallo. "Global forestry areas, deforestation and mental health: a worldwide ecological study." *The Journal of Climate Change and Health* 6 (2022): 100109. <https://doi.org/10.1016/j.joclim.2021.100109>
- [4] Geetha, K. "Resilient Farming Practices for Coping with Climate Change-Induced Risks." *National Journal of Smart Agriculture and Rural Innovation* 2, no. 1 (2024): 1-8. <https://doi.org/10.17051/NJSARI/02.01.01>
- [5] Karaer, Mina Cansu, Nina Čebulj-Kadunc, and Tomaž Snoj. "Stress in wildlife: comparison of the stress response among domestic, captive, and free-ranging animals." *Frontiers in Veterinary Science* 10 (2023): 1167016. <https://doi.org/10.3389/fvets.2023.1167016>
- [6] Karim, Md Zawadul, Md Al-Mamun, Masuma Parvin, Maliha Azad Eva, and Abul Kalam. "Mental Health Consequences of Riverbank Erosion: Examining Anxiety and PTSD Among Affected Communities in Southwestern Bangladesh." (2025). <https://doi.org/10.21203/rs.3.rs-6042886/v1>
- [7] Kaya Kılıç, Ayten, Sinem Burcu Uğur, and Kerime Bademli. "The relationship between post-traumatic stress, hopelessness and resources adequacy in fire disaster survivors: a mediation analysis." *Clinical Social Work Journal* (2024): 1-12.
- [8] Khan, Zafar. "Predictive analysis of climate change impact using multiphysics simulation models." *Bridge: Journal of Multidisciplinary Explorations* 1, no. 1 (2025): 23-30. <https://doi.org/10.17051/JME/01.01.03>
- [9] Muminova, Kimsankhon, and Feruza Erkinova. "The Impact of Environmental Changes on The Human Body." *Journal of Multidisciplinary Sciences and Innovations* 1, no. 3 (2025): 608-613.
- [10] Nakamura, Hiroto, and Samuel O'Donnell. "The effects of urbanization on mental health: A comparative study of rural and urban populations." *Progression Journal of Human Demography and Anthropology* (2025): 27-32.
- [11] Nkemjika, Stanley, Colvette Brown, Henry Onyeaka, Srikanta Banerjee, and Jennifer A. Oliphant. "Association Between Climate Change Awareness and Depression & Anxiety: Findings from a US Sample." *International Journal of Environmental Research and Public Health* 22, no. 9 (2025): 1426. <https://doi.org/10.3390/ijerph22091426>

- [12] Nnanna, Tobechei Brendan, Ejiro Marvis Akpotabor, Kenechukwu Samuel Okafor, Oluwadamilola Esther Akinbo, Chibuike Stephen Nzereogu, Damilola Ademola Oladosu, and Doris Ada Ojum. "Addressing workforce shortages in mental health care for climate-displaced populations: A systematic review of global challenges and solutions." (2025). <https://doi.org/10.53771/ijbpsa.2025.10.2.0082>
- [13] Palomo-Vélez, Gonzalo, Hanne Wiegel, Rodolfo Sapiains, and Gabriela Azócar. "Psychological and Mental Health Implications of Emerging Issues: Climate Change, Climate Mobilities, and COVID-19." In *Handbook of Latin American Health Psychology*, pp. 489-509. Springer, Cham, 2025.
- [14] Rao, Ishaan, and Meenal Saxena. "Exploring the Connections of the Mental Health and Sustainability." *International Journal of SDG's Prospects and Breakthroughs* (2025): 8-14.
- [15] Rückle, Karolin, Apoorv Agrawal, Hanna Andersson, Bálint Balázs, Erika Brattich, Maria Carelli, Claudia De Luca et al. "Determinants and relationships of climate change, climate change hazards, mental health, and well-being: a systematic review." *Frontiers in Psychiatry* 16 (2025): 1601871. <https://doi.org/10.3389/fpsy.2025.1601871>
- [16] Schuck-Paim, Cynthia, Wladimir J. Alonso, and Eric Slywitch. "Animal welfare and human health." In *Routledge handbook of animal welfare*, pp. 321-335. Routledge, 2022. <https://doi.org/10.4324/9781003182351-29>
- [17] Shareeff, Najmah, Rini Kuswohadi Pramono, and Arsan Saliha. "Climate Change and Mental Health: Exploring the Psychological Impacts of Environmental Distress in Indonesia." *Scientia Psychiatrica* 5, no. 4 (2024): 605-618. <https://doi.org/10.37275/scipsy.v5i4.179>
- [18] Tesfaye, Amensisa Hailu, Ashenafi Kibret Sendekie, Gebisa Guyasa Kabito, Garedew Tadege Engdaw, Girum Shibeshi Argaw, Belay Desye, Abiy Ayele Angelo, Fantu Mamo Aragaw, and Giziew Abere. "Post-traumatic stress disorder and associated factors among internally displaced persons in Africa: A systematic review and meta-analysis." *PLoS one* 19, no. 4 (2024): e0300894. <https://doi.org/10.1371/journal.pone.0300894>
- [19] Thoma, Myriam V., Nicolas Rohleder, and Shauna L. Rohner. "Clinical ecopsychology: The mental health impacts and underlying pathways of the climate and environmental crisis." *Frontiers in psychiatry* 12 (2021): 675936. <https://doi.org/10.3389/fpsy.2021.675936>

- [20] Ventriglio, Antonio, Julio Torales, João M. Castaldelli-Maia, Domenico De Berardis, and Dinesh Bhugra. "Urbanization and emerging mental health issues." *CNS spectrums* 26, no. 1 (2021): 43-50. <https://doi.org/10.1017/S1092852920001236>
- [21] Walinski, Annika, Julia Sander, Gabriel Gerlinger, Vera Clemens, Andreas Meyer-Lindenberg, and Andreas Heinz. "The effects of climate change on mental health." *Deutsches Ärzteblatt International* 120, no. 8 (2023): 117. <https://doi.org/10.3238/arztebl.m2022.0403>
- [22] Wigand, Moritz E., Cristian Timmermann, Ansgar Scherp, Thomas Becker, and Florian Steger. "Climate change, pollution, deforestation, and mental health: Research trends, gaps, and ethical considerations." *GeoHealth* 6, no. 11 (2022): e2022GH000632. <https://doi.org/10.1029/2022GH000632>