

Agriculture

# Farmland Abandonment Worldwide

## The Detrimental Factor of Agricultural Crisis

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The abandonment of agricultural land has emerged as a pressing global concern, influenced by a multitude of contributing factors. In numerous nations, the swift processes of urbanization and industrialization have resulted in the disregard for agricultural land, as attention shifts towards more lucrative enterprises. Moreover, shifting climate patterns and extreme meteorological phenomena have rendered it progressively more difficult for agriculturalists to manage their land with efficacy. The abandonment of agricultural land can result in severe repercussions for food security, economic stability, and environmental sustainability. Furthermore, as agricultural lands remain uncultivated, they may face the threat of degradation and a decline in biodiversity. It is imperative for governments and international organizations to prioritize the formulation of policies that bolster the agricultural sector and provide incentives for farmers to persist in cultivating their land. By tackling the fundamental causes of farmland abandonment, we can secure the resilience and productivity of agricultural systems for future generations.

**Keywords:** Farmland Abandonment; Sustainability; World Economy; Agriculture

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### Introduction

THE GLOBAL phenomenon of farmland abandonment constitutes a multifaceted challenge that may yield considerable ecological consequences (Sheng-fa & Li, 2017). As population growth and urbanization persist, particularly in developing nations, an increasing number of farmers are abandoning their agricultural territories in pursuit of more lucrative opportunities in urban areas (Orsini et al., 2013). This trend

is leading to the deterioration of soil quality, a decline in biodiversity, and an augmented susceptibility to insect infestations and disease outbreaks. As people may resort to clearing new land for cultivation, abandoned farmland can also contribute to deforestation (Rocha et al., 2023). The consequences of farmland abandonment extend beyond local boundaries, possessing a global dimension. Such abandonment can contribute to food insecurity, intensify climate change through heightened green-

house gas emissions resulting from degraded soils, and disrupt essential ecosystems (Campbell et al., 2008). Addressing this crisis necessitates a comprehensive approach that takes into account the requirements of both farmers and ecosystems. This includes the implementation of sustainable land management practices, the provision of incentives for small-scale agriculture, and the formulation of policies intended to foster rural development (Sims & Kienzle, 2017).

## Causes and Factors Contributing to Farmland Abandonment

### Environmental Factors

The abandonment of farmland is primarily caused by soil degradation, which is a significant environmental issue. Substandard soil quality resulting from erosion, compaction, salinization, and nutrient depletion can significantly hinder the growth and vitality of crops (Khanal & Watanabe, 2006). Consequently, farmers may be compelled to relinquish their property and pursue more fertile regions for cultivation.

Farmland abandonment is significantly impacted by climate change, among other environmental factors. Alterations in climatic conditions, rising temperatures, and an increase in the frequency of extreme weather phenomena, including droughts and floods, can significantly disrupt agricultural production and pose challenges for farmers in sustaining their livelihoods (Ali et al., 2017). Due to the erratic and unfavorable conditions brought on by climate change, farmers may occasionally be compelled to abandon their land.

Farmland abandonment can be exacerbated by pollution, which is a significant environmental factor. Pollution resulting from industrial activities, the application of pesticides, and the use of chemical fertilizers can lead to the contamination of soil and water, rendering them noxious and inappropriate for agricultural purposes (Verma et al., 2017). In certain instances, pollution may reach such critical levels that farmers are compelled to relinquish their land to safeguard both their own health and that of consumers.

Farmland abandonment can also be caused by water scarcity, which is an environmental factor. As a result of escalating demand for water driven by population growth and urbanization, numerous regions are encountering water shortages that hinder farmers' ability to irrigate their crops effectively (Ghasemzadeh, 2012; Musse, 2021). In the absence of a sufficient water supply, farmers may be compelled to relinquish their land and pursue more hydric regions for agricultural endeavors.

Farmland abandonment is influenced by a number of environmental factors, including land degradation and deforestation. As urban areas continue to expand and agricultural land is repurposed for alternative uses, farmers may find themselves compelled to vacate their traditional farming regions, ultimately resulting in the abandonment of their land (Khanal & Watanabe, 2006; Zhou et al., 2020). Farmers' problems are exacerbated by the fact that deforestation can result in soil erosion and a decline in biodiversity.

Moreover, the decline in biodiversity and the degradation of ecosystem services may significantly contribute to the phenomenon of farmland abandonment. Farmers may find it diffi-

cult to maintain a healthy and productive environment for their crops as natural habitats are lost and species populations decline (Ustaoglu & Collier, 2018). In the absence of the advantages conferred by a diverse ecosystem, farmers may encounter significant challenges in maintaining their agricultural practices, potentially leading to the necessity of relinquishing their land (Fischer et al., 2012).

### Economic Pressures and Market Forces

A significant economic factor contributing to the abandonment of farmland is the escalating costs associated with inputs, such as seeds, fertilizers, pesticides, and machinery. As the expenses associated with these inputs persist in rising, numerous small-scale farmers encounter challenges in affording them, thereby hindering their capacity to sustain their agricultural operations (Havinal, 2020). Moreover, the volatility of market prices for agricultural commodities presents a considerable challenge for farmers, as they may find it difficult to cover their costs and achieve profitability (Mpandeli & Maponya, 2014). Farmers may eventually decide to sell their farmland in pursuit of more financially advantageous opportunities as a result of this.

Another economic factor that may lead to the abandonment of farmland is the insufficient access to credit and financing. In the absence of requisite capital for investment in their agricultural enterprises, farmers may encounter difficulties in enhancing their apparatus, adopting contemporary farming methodologies, or expanding their operations (Fadeyi, 2018). Due to their inability to contend with larger, more financially secure farms, they may be compelled to abandon their farmland. The absence of access to credit can be especially detrimental for farmers in developing nations, where financial institutions may exhibit a reluctance to extend loans to agricultural producers (Fletschner & Kenney, 2014).

Moreover, economic pressures may be intensified by environmental factors, including climate change and natural disasters. These occurrences can have catastrophic effects on farmland, obliterating crops and infrastructure and causing farmers to suffer significant financial losses (Arora, 2019). Many farmers may decide to sell their farmland in the face of these difficulties rather than continue investing in a venture that is uncertain and hazardous (Ortmann et al., 1992). This may exacerbate the economic challenges encountered by farmers and contribute to the issue of farmland abandonment.

Farmland abandonment can also be significantly influenced by changes in commodity prices. When the prices of specific crops or livestock decline, farmers may encounter difficulties in achieving profitability and may be compelled to relinquish their property as a means of reducing expenses and maintaining financial viability (Feyen et al., 2020; Paulson & Sherrick, 2009). This situation can be especially detrimental for small-scale farmers who lack the resources necessary to endure economic downturns or to invest in the cultivation of new, more lucrative commodities (Key, 2019). Consequently, the abandonment of farmland may evolve into a detrimental cycle, wherein economic pressures compel farmers to relinquish their land, thereby resulting in additional decreases in both productivity and profitability.

Farmland abandonment may be exacerbated by increased competition in the global marketplace. As larger, more mechanized agricultural enterprises increasingly dominate the market, small-scale farmers are encountering significant challenges in maintaining competitiveness. This situation may result in farmers relinquishing land that they cannot cultivate profitably, as larger competitors undermine prices, thereby forcing smaller enterprises out of the market. This trend is especially alarming in developing nations, where small-scale farmers frequently lack the necessary resources and infrastructure to effectively compete with larger, more industrialized agricultural enterprises.

Environmental factors, such as soil degradation or climate change, can sometimes be the cause of farmland abandonment. Farmers may be less likely to invest in sustainable practices or soil conservation strategies if they do not perceive a clear economic advantage, which can exacerbate these problems. Due to farmers' inability to generate a profit from deteriorated land, farmland may progressively become less productive over time, resulting in abandonment. This situation may have significant repercussions for food security and agricultural sustainability, as neglected farmland can lead to land degradation and environmental deterioration.

Ultimately, market dynamics exert a considerable influence on the global phenomenon of farmland abandonment. As consumer preferences evolve, commodity prices experience volatility, and competition intensifies, farmers encounter mounting pressure to relinquish land that has become unprofitable or unsustainable (Beñayas et al., 2007). As abandoned farmland can result in decreased productivity, increased land degradation, and financial hardship for farmers, this can have significant repercussions for food security, environmental sustainability, and rural economies (Chen et al., 2022). To effectively address these issues, it is imperative to adopt a multifaceted approach that considers both the economic and environmental factors contributing to farmland abandonment. This strategy should aim to support small-scale farmers and promote sustainable agricultural practices, thereby enhancing food security and fostering rural development.

## Social and Demographic Trends

Urbanization is one of the major social factors contributing to farmland abandonment. As an increasing number of individuals migrate to urban areas in pursuit of enhanced employment prospects and elevated living standards, rural regions are experiencing a decline in their workforce, resulting in a diminished capacity to cultivate the land (Yu et al., 2017). Eventually, farmland is abandoned as a result of the decline in agricultural production. As more land is used for commercial and residential purposes as a result of urbanization, land use practices change, further decreasing the quantity of farmland that is currently available (Khanal & Watanabe, 2006).

Changes in agricultural practices are another sociocultural factor that contributes to farmland abandonment. As technological advancements continue and contemporary agricultural techniques gain prominence, traditional farming practices are increasingly being supplanted by more mechanized and industrialized approaches (Suliman & Buchroithner, 2009). This transformation in agricultural practices may result in farmers relinquishing their land, as they may lack the necessary resources or expertise to adapt to these changes.

Demographic factors, including population growth and the aging of populations, significantly contribute to the phenomenon of farmland abandonment (Khanal & Watanabe, 2006). As the global population continues to rise, there is an escalating demand for sustenance and resources. This situation may exert pressure on farmers to increase food production, resulting in the overexploitation of land and, ultimately, its abandonment (Yu et al., 2017). Furthermore, as populations age, there is a likelihood that there will be a decline in the number of younger individuals interested in taking over and working on the family farm, which may result in the abandonment of farmland.

The availability of resources, including water and land, significantly contributes to the phenomenon of farmland abandonment (Potter & Lobley, 1992). Farmers may find it more challenging to maintain their operations as a result of the ongoing effects of climate change on the availability of water and arable land (Huang et al., 2020). As farmers may lack the resources required to continue farming in the midst of these challenges, this can result in farmland being abandoned.

The abandonment of farmland may also be influenced by political and economic considerations (Lana-Renault et al., 2020). Trade policies, subsidies, and land ownership regulations can significantly influence farmers' capacity to sustain their agricultural activities (Li & Li, 2017). Farmers may be compelled to give up their farmland if they lack access to financial assistance or are unable to compete in the global market.

In sum, a multitude of social and demographic factors—including urbanization, alterations in agricultural practices, population growth, an aging demographic, access to resources, as well as political and economic influences—collectively contribute to the phenomenon of farmland abandonment on a global scale. To ensure the sustainable use of farmland for future generations, it is crucial for policymakers, farmers, and communities to collaborate in addressing these issues and finding solutions. By comprehending the intricate interrelationships among these factors, we can endeavor to establish a more resilient and sustainable agricultural system that benefits both farmers and the environment.

## Impacts of Farmland Abandonment on Ecology and Biodiversity

### Loss of Habitats and Species Decline

One of the most immediate consequences of farmland abandonment on ecosystems is the decline of agricultural crops and vegetation that previously offered sustenance and refuge for a multitude of species (Isbell et al., 2019). As agricultural fields are allowed to lie fallow, the plant communities that once flourished in these ecosystems gradually diminish, resulting in a significant loss of food and refuge for numerous animal species (Husaini & Sohail, 2024). The populations of insects, birds, mammals, and other fauna that depend on farmland for sustenance may decline as a result.

The connectivity of habitats and the fragmentation of wildlife populations can also be affected by the abandonment of farmland. In order to travel between various habitats, including

forests, wetlands, and grasslands, many species depend on farmland (Klimek et al., 2014). The abandonment of farmland disrupts these corridors, thereby hindering animals' ability to locate sustenance, mates, and appropriate habitats (Overed-Sayer et al., 2025). This disruption may result in the isolation of populations, a reduction in genetic diversity, and an elevated risk of extinction for certain species.

The abandonment of farmland may also exert indirect effects on habitats and contribute to the decline of various species. For instance, neglected farmland may become overrun with invasive species that outcompete native vegetation and disturb the region's ecological equilibrium (Uematsu et al., 2009). This may further diminish the habitat's suitability for indigenous wildlife and contribute to a decline in species populations.

Another significant consequence of farmland abandonment on habitats and the decline of species is the reduction of ecosystem services that agricultural land offers. Farmland frequently functions as a protective barrier against pollution and erosion, in addition to being a vital source of pure water, carbon sequestration, and climate regulation (Schirpke et al., 2012). These ecosystem services are jeopardized when farmland is abandoned, which has negative effects on the environment and the species that rely on it.

The structure and composition of habitats can also alter as a result of farmland abandonment, which may not be advantageous for all species (Schirpke et al., 2012). For instance, abandoned farmland might experience succession and change into a different habitat type, like woodland or scrubland (Cramer et al., 2008). Although certain species may derive advantages from these alterations, others that are specifically adapted to open agricultural environments may encounter difficulties in adaptation and experience reductions in their populations.

In areas with high levels of agricultural intensification and land use change, the loss of habitats and decline of species caused by farmland abandonment is especially alarming (Perrings & Halkos, 2015). The abandonment of farmland in these regions can result in a more pronounced decline in habitats and species, as the availability of natural habitats and resources to sustain wildlife populations is significantly diminished (Uematsu et al., 2009). This may result in intensified competition for resources such as food and shelter, elevated predation rates, and diminished reproductive success for numerous species.

In addition to the direct effects of farmland abandonment on habitats and the decline of species, it is imperative to consider the socio-economic repercussions that arise from this phenomenon. Farmland that has been abandoned can have a negative impact on agricultural productivity, which can result in lower food production and financial losses for both farmers and land proprietors (Khanal & Watanabe, 2006). This may lead to land degradation, soil erosion, and the erosion of livelihoods for individuals who rely on the land for their income.

In order to mitigate the effects of farmland abandonment on habitat degradation and the decline of species, it is imperative to implement conservation initiatives aimed at the protection and restoration of abandoned agricultural land (van der Zanden et al., 2017). This may entail the adoption of land management strategies that enhance biodiversity, including agroforestry,

rewilding, and sustainable agricultural practices. In order to preserve and enhance the ecological value of abandoned farmland, conservation organizations can collaborate with proprietors and local communities to develop land stewardship programs.

## Soil Degradation and Erosion

A significant consequence of farmland abandonment on soil degradation is the decline in soil fertility. The fertility of the soil decreases when farmland is no longer actively managed and cultivated (Sulieyman & Buchroithner, 2009). This may lead to a reduction in crop yields and a decline in the overall productivity of the land. Furthermore, the absence of vegetation on abandoned farmland can result in soil erosion, as the soil becomes more vulnerable to both wind and water erosion (Cerdà 1997).

The abandonment of farmland also has a significant impact on soil erosion. When farmland is left uncultivated, the soil becomes exposed to the elements and is susceptible to erosion caused by precipitation or wind (Lesschen et al., 2008). This erosion not only results in the depletion of valuable subsoil but also contributes to sedimentation in aquatic environments, which can adversely affect marine ecosystems.

Moreover, the abandonment of farmland may lead to heightened soil compaction. When land ceases to be cultivated, the soil becomes compacted due to various factors, including pedestrian traffic and the use of large machinery (Nawaz et al., 2012). Compacted soil exhibits diminished porosity, which impedes water infiltration and root development, consequently resulting in a decline in plant productivity.

Another consequence of farmland abandonment on soil degradation is the proliferation of invasive plant species. Invasive plants can rapidly establish themselves and spread when farmland is neglected, outcompeting native vegetation (Martínez et al., 2019). These invasive plant species can intensify soil degradation by further depleting essential soil nutrients and water resources.

The salinity of the soil can also rise as a result of farmland abandonment. In arid and semi-arid regions where irrigation practices are prevalent, abandoned farmland that was previously irrigated may experience the accumulation of minerals in the soil as a result of water evaporation (Sakadevan & Nguyen, 2010). The accumulation of ions may result in soil salinization, which adversely affects plant growth and agricultural productivity.

Furthermore, the decline in biodiversity represents an additional consequence of farmland abandonment contributing to soil degradation. The abandonment of farmland results in a decline in the diversity of plant and animal species that previously occupied the area, which subsequently contributes to a decline in the health of the soil and the overall functioning of the ecosystem (Ustaoğlu & Collier, 2018). Biodiversity plays a crucial role in sustaining soil fertility, facilitating nutrient cycling, and managing insect populations, all of which are vital components of sustainable agricultural practices (Samantaray et al., 2024).

Additionally, the deterioration of soil structure caused by farmland abandonment can contribute to land degradation. The soil becomes compacted and loses its natural structure when farmland is no longer cultivated. This may result in diminished soil aggregation, thereby impacting water retention and the

availability of nutrients within the soil (Khanal & Watanabe, 2006). The deterioration of soil structure may render the soil increasingly susceptible to erosion and degradation.

The abandonment of farmland can also have social and economic repercussions on rural areas. The abandonment of farmland can result in significant adverse effects on rural communities that rely on agriculture for their economic sustenance, leading to diminished income and heightened food insecurity (Xu et al., 2013). It can be challenging for communities to rehabilitate abandoned land and resume agricultural activities due to the degradation of soil brought on by farmland abandonment.

### Strategies and Solutions for Addressing Farmland Abandonment

One approach to mitigating farmland abandonment involves offering assistance to small-scale farmers to enhance the economic viability of their operations. This encompasses access to credit facilities, technical assistance, and marketing support services (Valliant et al., 2019). By assisting farmers in enhancing their productivity and profitability, there is a greater likelihood that they will persist in utilizing their land for agricultural purposes rather than relinquishing it.

An alternative solution involves providing incentives to proprietors to maintain their land in productive use through initiatives such as conservation easements or payments for ecosystem services (Wright & Anella, 2007). By providing compensation to proprietors for the environmental advantages conferred by their land, such as carbon sequestration and habitat preservation, there is an increased likelihood that they will continue to sustain their agricultural activities (Kemkes et al., 2009).

Moreover, the promotion of sustainable agricultural practices can mitigate the risk of farmland abandonment by enhancing soil health, decreasing water consumption, and bolstering resilience to climate change (Chaudhary et al., 2019). Practices including conservation tillage, cover cropping, and crop rotation can assist farmers in sustaining the long-term productivity of their land.

It is imperative to tackle the underlying factors contributing to farmland abandonment, including rural depopulation and land consolidation. We can help revitalize rural communities and keep farmland productive by investing in rural infrastructure, generating employment opportunities, and facilitating land access for new farmers (Wang et al., 2020).

Furthermore, the implementation of policies designed to safeguard agricultural land from being repurposed for non-agricultural applications can contribute to the mitigation of

farmland abandonment (Khanal & Watanabe, 2006). Zoning regulations, land use planning, and agricultural easements serve to safeguard prime farmland for agricultural purposes, thereby preventing its conversion to developmental uses (Francis et al., 2012).

Collaboration among governmental entities, non-profit organizations, and private sector stakeholders is imperative for effectively addressing the issue of farmland abandonment (Wang et al., 2020). Through collaborative efforts to formulate and execute comprehensive strategies, we can more adeptly confront the intricate challenges associated with farmland abandonment (Chaudhary et al., 2020).

Education and outreach initiatives can significantly contribute to the prevention of farmland abandonment by enhancing awareness of the critical significance of agricultural land, advocating for sustainable farming practices, and offering resources and support to farmers (Yu et al., 2017). Investing in research and innovation within the agricultural sector can facilitate farmers' adaptation to evolving conditions while enhancing the productivity and sustainability of their operations (Stringer et al., 2019). Technologies including precision agriculture, genetic engineering, and alternative energy sources have the potential to assist farmers in surmounting challenges and maintaining competitiveness within the global marketplace.

Therefore, the promotion of local food systems and the support of small-scale agriculture can mitigate the abandonment of farmland by establishing markets for locally sourced produce, minimizing the distance food must traverse from farm to table, and enhancing the relationships between farmers and consumers. By providing support to local farmers and enterprises, we can contribute to the sustainable viability of agriculture and mitigate the risk of farmland abandonment.

### Conclusion

In conclusion, the issue of farmland abandonment presents a pressing challenge that requires concerted efforts at local, national, and global levels. By understanding the root causes, recognizing the diverse impacts, and implementing effective strategies, we can work towards mitigating the ecological and socio-economic consequences of abandoned farmlands. Through sustainable land management practices, innovative policies, and community engagement, we can strive to restore and preserve agricultural landscapes for the benefit of both nature and society. It is essential that we address the crisis of farmland abandonment with urgency and commitment to safeguard the future of our planet's vital resources. ■

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