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Special Issue - Food Justice and Food Sovereignty in the context of the Right to Food

BALANCING THE RIGHT TO FOOD AND ENVIRONMENTAL SUSTAINABILITY: A CALL FOR HOLISTIC TRANSFORMATION

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ABSTRACT

This paper conducts an in-depth examination of the intricate nexus between the right to food and ecosystem conservation, recognizing the fundamental importance of addressing these interlinked issues for sustainable global development. Anchored in international and national legal frameworks, the right to food is explored not only as a moral imperative but as a binding human rights obligation. The analysis spans a broad spectrum, encompassing the impact of human activities such as population growth, climate change, and intensive agricultural practices on natural resources, biodiversity, and environmental sustainability. The literature review highlights the far-reaching repercussions of food access constraints on marginalized populations, emphasizing the profound relationship between food and the environment. The study underscores the critical role of biodiversity, soil health, and climate change in shaping food security challenges, with a particular focus on the consequences of industrial agriculture. The examination of agroecology emerges as a central theme, offering a holistic approach that integrates ecological, health, social, and economic considerations into agricultural and food systems. The methodology involves a comprehensive review of published studies in the specified domains, providing a robust foundation for unraveling the complex dynamics and interdependencies between the right to food, ecosystem conservation, and the broader context of climate change and human activities. The paper puts forth a series of recommendations, emphasizing the need for policies that integrate human rights into agricultural actions, enhanced inclusivity for smallholder farmers, widespread adoption of agroecology, and educational campaigns to raise awareness. Agroecology is positioned as a key solution, not only for its contributions to climate resilience but also for its positive impact on soil health, biodiversity conservation, and long-term environmental sustainability. The paper advocates for a paradigm shift in global agricultural strategies, emphasizing integrated, sustainable approaches that prioritize inclusivity, environmental stewardship, and the well-being of present and future generations. The recommendations serve as a blueprint for policymakers, practitioners, and stakeholders to collaboratively work towards a future where food security coexists harmoniously with ecosystem conservation, ensuring a sustainable and equitable world for all.

Key words: Right, Food, Ecosystem, Conservation, Sustainable, Climate, Biodiversity, Agroecology, Agriculture, Policy

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INTRODUCTION

The right to food represents a fundamental human entitlement, safeguarded by numerous international and national legal frameworks. Beyond being a moral imperative or a policy option, it is a legally binding human rights obligation in many nations. The concept of the right to food is established in the 1948 Universal Declaration of Human Rights as an integral element of the right to an adequate standard of living, and it is enshrined in the 1966 International Covenant on Economic, Social and Cultural Rights. Moreover, it is protected by regional agreements, national constitutions, and legislations. The Office of the United Nations High Commissioner for Human Rights [1] articulates that every individual, regardless of their race, gender, language, religion, political beliefs, nationality, or social status, has the inherent right to sufficient food and the freedom from hunger. The right to food aligns seamlessly with human rights because constraints on food access have far-reaching repercussions on economies and disproportionately impact the well-being, economic capacities, productivity, education, and human potential of marginalized populations. This phenomenon is exacerbated by ongoing ecosystem degradation, which has a direct bearing on natural resources and, consequently, the accessibility of food and nutrition. The relationship between food and the environment is particularly discernible, reflecting the intricate interplay between human beings and nature.

LITERATURE REVIEW

The data from literature review is divided into various areas including population context, climate change, soil health, and agroecology and human rights.

Human Population Context

Various factors affect the right to food and ecosystem with human population growth being one of them. The impact of human population, as highlighted by Cafaro *et al.* [2] leads to the displacement of natural habitats and the degradation of ecosystems, both of which endanger various species and disrupt vital ecological processes. Data underscores the significant depletion of global fish stocks, with 50 percent fully exploited, 30 percent overexploited, and 90 percent of large predatory fish stocks already depleted [3]. The alarming rise in the human population over the past century, from two billion to nearly eight billion, further intensifies the competition for natural resources. The consequence of this increased pressure on ecosystems and natural resources is a dire impact on food security, restricting access to food and, in turn, violating the right to food. This is because food production and the availability of nutritious, culturally appropriate, and healthy food depend not only on diversified ecosystems but also on cooperation with various organisms, including plants, animals, insects, and microorganisms [4]. Food production systems rely on a wide

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array of biological components for sustenance, ranging from direct sources of nutrition to the underlying processes that make agriculture feasible, such as water supply, soil fertility, pollination, and natural pest control [5].

The consequences of these dynamics are glaring in the form of global food and nutrition shortages. More than one billion people suffer from undernourishment, over two billion lack essential vitamins and minerals, and nearly six million children succumb annually to malnutrition or related ailments [3]. This predicament disproportionately affects smallholders and landless individuals, primarily women and girls living in rural areas with limited access to productive resources [6].

Right to Food and Climate Change

The persistent challenge of climate change intensifies concerns surrounding food security and the imperative to uphold the right to food. Climate change causes extreme weather patterns, disrupting food and nutrition accessibility, particularly in regions reliant on rain-fed agriculture, like many parts of Africa. Climate-related factors, such as temperature increases, ocean acidification, and extreme weather events, further impede food production [3]. Paradoxically, the food system itself contributes to climate change, as agriculture, forestry, and land-use changes account for a substantial share of anthropogenic greenhouse gas emissions [3]. Agriculture, in particular, is responsible for 80% of land-use changes, including deforestation and peatland degradation, resulting in the loss of carbon-rich ecosystems and their genetic resources [3]. To ensure the right to food for current and future generations, the world must focus on sustainable food production practices while focusing on increased production. This requires conservation and protection of biodiversity as it is proven that biodiversity plays a pivotal role in food security and nutrition, providing the genetic diversity needed for enhanced food production and adaptability to varying environmental and socio-economic conditions. Biodiversity, and its extension into healthy ecosystems, proves essential not only for enhancing food production but also for fortifying the resilience of communities in the face of climate change [3]. The escalating pressures on natural resources, driven by population growth and climate change, negatively affect biodiversity, leading to a reduction in species diversity, genetic variation, and the sustainability of ecosystems [3]. Habitat loss, chiefly due to land conversion for agriculture and pastures, remains the principal cause of biodiversity loss, further reducing the richness of landscapes endangering native species and disrupting ecological balance [7]. As the global community wrestles with the loss of biodiversity, a phenomenon affecting both food security and the fundamental right to adequate nourishment, there is underutilization of the existing biodiversity for food and nutrition. At present, only a fraction of the Earth's edible terrestrial plants is used for

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sustenance, with just four crops—wheat, rice, maize, and potatoes—providing 60 percent of the world's energy intake [3].

Soil Health, Right to Food and Environmental Sustainability

In any discussion regarding the nexus between the right to food and the environment, the significance of soil should not be overlooked. Soil is a living organism that serves as a reservoir for at least a quarter of global biodiversity, contributing to primary nutrient cycles that are indispensable for both plants and animals. Effective soil management plays a vital role in carbon sequestration, which is critical for climate change mitigation. Terrestrial and marine ecosystems collectively remove approximately 60 percent of carbon emissions from the atmosphere annually, regulating the Earth's surface temperature [8]. Hence, efficient soil management is a crucial element in addressing climate change and preventing further biodiversity loss. Industrial agriculture, however, poses a substantial threat to soil and biodiversity. The pursuit of higher production through chemical inputs, monocropping, heavy tilling, and land conversion leads to soil degradation and the loss of biodiversity-rich ecosystems. This shift results in habitat destruction, threatening and displacing wildlife species while reducing landscape diversity and crowding out native plants [7]. Another concerning aspect is the practices associated with livestock production. The traditional ways of small herding are dwindling as grazing areas become more enclosed, leading to the prevalence of animal feed lots, sub-therapeutic antibiotic use, and manure lagoons. The expansion of meat production is often accompanied by deforestation for grazing, particularly in areas affected by food scarcity [9]. Overgrazing, as observed in some food-stressed regions such as the Mongolian steppe, has potential ecological repercussions, like locust outbreaks [10].

The livestock sector has witnessed advancements aimed at reducing its land use and greenhouse gas emissions over time. Despite these improvements, the sector's environmental footprint remains a challenge due to heightened demand, hindering substantial reductions [11]. The adverse environmental impact primarily stems from intensive livestock farming. Conversely, extensive livestock farming is recognized for its positive influence on the environment. Griscon *et al.* [12] highlight that in grassland and savanna biomes, particularly where large grazers are absent, employing extensive rangeland practices with ruminant livestock can contribute significantly to biodiversity conservation and climate mitigation. FAO [13] supports this perspective, asserting that maintaining livestock in grazing systems can offer environmental benefits such as the preservation of grassland biodiversity. Poux and Aubert [14] further emphasize the essential role of livestock production systems in circular production systems, reinforcing the significance of livestock in ecosystems. Collectively, these studies underscore that the challenge lies not in livestock

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keeping, but specifically in addressing the environmental impacts of intensive livestock farming. Unfortunately, the days of small herders have become numbered as the commons becomes increasingly fenced in and pastoralists have few places to bring their herds.

Soil health has an impact on biodiversity, which is part of the extended ecosystems and key to food security and nutrition. This is because soil is a reservoir for at least a quarter of global biodiversity which support primary nutrient cycle that plant and animals depend on, hence important in ensuring food and nutrient security and accessibility [3]. The genetic component of biodiversity provides the variation needed to increase food production, enhance its quality and adapt it to the ever-changing environmental and socio-economic conditions. Biodiversity also provides essential services to production systems, while healthy ecosystems are resilient to stress and are crucial for coping with the effects of climate change [3]. In the last five decades, the primary driver of habitat loss has been the transformation of natural ecosystems into agricultural land or pasture. This conversion has led to a decline in biodiversity [7], consequently jeopardizing the very goals of enhancing food security and accessibility, which crop production and pasture aim to achieve. Industrial agriculture has great impact on soil and biodiversity. This type of agriculture intends to increase production and food accessibility through increasing inputs but ends up reducing it, in the long run, through biodiversity loss [15]. This it does through chemical inputs, unsustainable practices such as monocropping and heavy tilling, and land use change whereby the areas rich of biodiversity are changed into farming land, killing the biodiversity in the process. Converting land to agriculture results in habitat destruction and biodiversity loss because the clearance of natural ecosystems, such as forests, removes the sources of shelter and food that wildlife species depend on to survive and thrive [7]. This has reduced the variety of landscapes and habitats, threatening or destroying the breeding, feeding and/or nesting of birds, mammals, insects and microbial organisms, and crowding out many native plant species [7].

Recent reports suggest that soil is being lost at a rate many times greater than the current replenishment rate [13]. Without large reserves of nutrient-rich soil, global society faces a dilemma concerning how to ensure not just enough calories for future generations but enough vitamins and minerals. This trend of nutrient-poor soil is not likely to quickly reverse itself because soil is slow to replenish. Therefore, deliberate changes in human actions are imperative to promote improved soil health and mitigate the consequences of soil degradation. In addition to crop and livestock production, it is imperative to recognize that other facets of food production also exert profound and lasting impacts on environmental sustainability. The contemporary, chemical-intensive agricultural paradigm emerged post-World War II,

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Volume 24 No. 10
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coinciding with the rise of industrial fishing fleets [16]. These industrial fishing practices have exerted a heavy toll on the world's oceans, resulting in the depletion of many commercial fish stocks and their ongoing struggle to rebound [17]. As these stocks decline, humanity has embarked on a dual trajectory: descending the food chain and assuming the role of "roving bandits" who traverse the seas in pursuit of untouched stocks once the resources in one region are depleted [18]. It is crucial to ensure sustainable practices in fish production, given its potential to exert adverse impacts on ecosystems, subsequently influencing both direct and indirect aspects of food security and the right to food.

Harmonizing Agroecology and Human Rights for Sustainable Food Systems

A crucial strategy for a comprehensive transformation of the food system to safeguard the right to adequate food and broader human rights, including the right to a safe environment, involves the adoption of agroecology. Agroecology, as outlined by Kerr *et al.* [19] is a holistic approach that integrates ecological, health, social, and economic considerations into the design and implementation of agricultural and food systems. It serves as a paradigm for food production and management, leveraging natural processes to enhance resilience and productivity [20]. This entails optimizing biomass recycling, maintaining favorable soil conditions, minimizing nutrient losses, fostering functional biodiversity, and promoting improved biological interactions and synergies [20]. As the world strives to transform its food systems to enhance food and nutrition access for all, the need to incorporate environmental security considerations and address long-term sustainable production issues, such as soil quality, becomes paramount. Most countries currently produce food for domestic consumption and export surplus agricultural commodities. However, they often neglect to assess the environmental costs associated with intensive industrial food production [21]. Agroecology works towards achieving this by emphasizing on enhancing soil fertility by promoting living soils, rather than regarding them merely as substrates for nutrient application [4]. Living soils serve as carbon repositories, and when crops are integrated with trees and animals, production systems play a more substantial role in countering global warming [4].

Despite concerns raised about agroecology's implications for food security and nutrition, especially in low-income countries, it is essential to recognize that the right to food doesn't authorize food production at the expense of the environment. Instead, it inherently encompasses the right to a healthy environment, emphasizing the need to conduct food production with sensitivity to preserve environmental resources for present and future generations. The right to a healthy environment and the right to food are interdependent, not hierarchical [19]. Studies have demonstrated that agro-ecological techniques significantly enhance yields. For

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instance, a study by Pretty *et al.* [22], showed that agroecology increased productivity on 12.6 million farms in 57 poor countries, covering 37 million hectares, with an average crop increase of 79%. This underscores the positive impact of agroecology on food security. To ensure successful strategies for food security and the right to food, it is crucial to consider the perspectives of smallholder farmers in a sustainable manner. This is particularly crucial because a significant portion of agricultural land worldwide is cultivated by smallholder farmers. In the developing world, smallholders play a pivotal role in producing the majority of consumed food. In Africa, for instance, Kenyan and Tanzanian small farmers contribute 63 and 69 percent of the country's food production, respectively [23]. Agroecology emerges as an ideal approach for fostering inclusivity, as it relies on the knowledge cultivated by farmers through their practical experiences [22, 24]. This approach is responsive to the specific needs and interests of all farmers, including smallholders who are often marginalized when top-down approaches are implemented. Traditional top-down approaches tend to exclude a significant portion of smallholder farmers [25]. Therefore, by prioritizing the insights and expertise of smallholders, agroecology aligns with an inclusive agenda that ensures the success and sustainability of strategies aimed at enhancing food security and the right to food.

By leveraging local knowledge and experience, agroecology places a reliance on locally produced inputs, presenting a sustainable alternative to combat the nutrient-poor and heavily degraded soils prevalent today. The heavily degraded soil doesn't require expensive commercial fertilizer [26]. This has been proven by agroecology which promotes the use of bio-inputs, proven to be a more cost-effective solution with demonstrated positive impacts on both yield and the environment [27]. Agroecology not only enhances food production but also addresses issues associated with industrial agriculture, such as inequalities, increased poverty, and environmental degradation, particularly climate change [28, 29]. Moreover, agroecology plays a role in reducing pressure on water resources, directly contributing to the conservation of biodiversity [28]. Consequently, agroecology emerges as the optimal choice to tackle concerns related to the right to food and ecosystem conservation.

Agroecology has demonstrated its effectiveness in enhancing climate resilience, particularly in the face of extreme weather events. For instance, following the impact of Hurricane Mitch in 1998, agricultural plots employing simple agroecological methods, such as rock bunds or dikes, green manure, crop rotation, and various soil conservation techniques, exhibited notable benefits. These agroecological plots, which incorporated practices like stubble incorporation, ditches, terraces, barriers, mulch, legumes, trees, plowing parallel to the slope, no-burn policies, live fences, and zero-tillage, showed significant advantages over non-agroecological plots. On

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Volume 24 No. 10
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ISSN 1684 5374

average, they had 40% more topsoil, higher field moisture, experienced less erosion, and incurred lower economic losses compared to their conventional counterparts. Additionally, agroecological plots demonstrated an 18% reduction in arable land loss to landslides, a 49% lower incidence of landslides, and a remarkable 69% reduction in gully erosion [30]. In the context of the escalating variability of weather conditions over the years, which disproportionately affects smallholder farmers, the adoption of agroecology becomes increasingly timely. As highlighted by De Schutter in Agroecology and the Right to Food [31], agroecology plays a crucial role in mitigating the risks associated with extreme weather events. Furthermore, it serves as a proactive measure against the potential Invasion of new pests, weeds, and diseases resulting from global warming. These findings underscore the pivotal contribution of agroecology in enhancing climate resilience, offering valuable evidence of its importance in addressing the challenges posed by a changing climate.

In addition to its role in climate resilience, agroecology actively contributes to the achievement of climate mitigation goals through enhanced carbon sequestration in soil organic matter and above-ground biomass, thereby reducing greenhouse gas (GHG) emissions [31]. One prominent method through which agroecology aids in GHG emission reduction is through crop rotation, particularly utilizing legumes. Legume rotation has been identified as having the potential to decrease GHG emissions, particularly those arising from fertilizer production and use, as well as addressing issues like acidification and ecotoxicity burdens, both terrestrial and aquatic [32]. Given that agriculture is a major contributor to greenhouse gas emissions [33], leveraging the GHG reduction potential of agroecology becomes a crucial aspect of global climate change mitigation efforts. However, there remains a need for further research on the linkage between agroecology and GHG emissions, as there is currently limited data in this area [34]. Some studies, such as that by Albanito *et al.* [32], suggest that certain agroecological practices like zero tillage, straw retention, organic manure application, and cover cropping may inadvertently increase GHG emissions. Thus, comprehensive studies are essential for understanding the full implications of agroecology on GHG emissions and for optimizing practices to minimize environmental impacts while maximizing climate mitigation benefits.

There is a crucial need for additional studies to delve into the broader spectrum of benefits offered by agroecology, extending beyond its association with greenhouse gas emissions, climate resilience, and ecosystem conservation. Claims about agroecology's inefficiency and labor intensiveness often overlook its multi-dimensional impacts on soil health, agroecosystem capacity, and the environmental footprint of alternative farming methods [35]. These claims, emphasizing efficiency solely in terms of yields per unit of surface area (hectares or acres), is two-

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Volume 24 No. 10
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dimensional and oversimplified hence fails to consider the crucial third dimension: the impact on soil health. Agroecology's benefits extend beyond immediate yields, encompassing effects on soil quality, which is a vital component of sustainable agriculture [35]. Additionally, the fourth dimension, time, must be taken into account when evaluating agroecology's potential for future production. This holistic perspective, is essential for a comprehensive understanding of agroecology's efficiency. Moreover, the criticism that agroecology is labor-intensive, as argued by McAfee [35], overlooks the labor involved in the manufacturing and transportation of the machinery, chemicals, and fuel required for conventional factory farming. Agroecology's labor intensity should be assessed in comparison to the overall energy and resource consumption associated with industrial agriculture. A more nuanced analysis is required to accurately evaluate the overall efficiency and sustainability of agro-ecological practices.

METHODOLOGY

The study is a deep dive into the nexus between the right to food and ecosystem conservation. The right to food in this study is defined by food and nutrition accessibility while the ecosystem variables are biodiversity and natural resources. This is studies alongside the impact of climate change and humanity including population, exploitation of natural resources and intensive agriculture. The study relied on review of published studies on the above areas.

The study represents an in-depth exploration of the intricate connection between the right to food and ecosystem conservation. The conceptualization of the right to food within the study is grounded in the accessibility of food and nutrition. Concurrently, the ecosystem variables under examination encompass biodiversity and natural resources. This investigation is conducted in tandem with an assessment of the broader impact of climate change and human activities, including population dynamics, the exploitation of natural resources, and the ramifications of intensive agricultural practices. Central to the study is the definition of the right to food, which pivots on the crucial aspect of ensuring accessibility to nutrition and sustenance. Simultaneously, the examination of ecosystem variables, such as biodiversity and natural resources, sheds light on the intricate interplay between human activities and the preservation of essential ecological components. The study incorporates a comprehensive analysis of the multifaceted influences contributing to the nexus between the right to food and ecosystem conservation. Noteworthy factors encompass the escalating impact of climate change, human population dynamics, the exploitation of natural resources, and the implications of intensive agricultural practices. These elements collectively shape the intricate relationship between human well-being and environmental sustainability. The methodological approach of the study involves a thorough review of published research in the specified

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domains. This rigorous examination of existing literature serves as the foundation for unraveling the complex dynamics and interdependencies between the right to food, ecosystem conservation, and the broader context of climate change and human activities. The reliance on established studies ensures a robust and evidence-based exploration of the relationships within the study's purview.

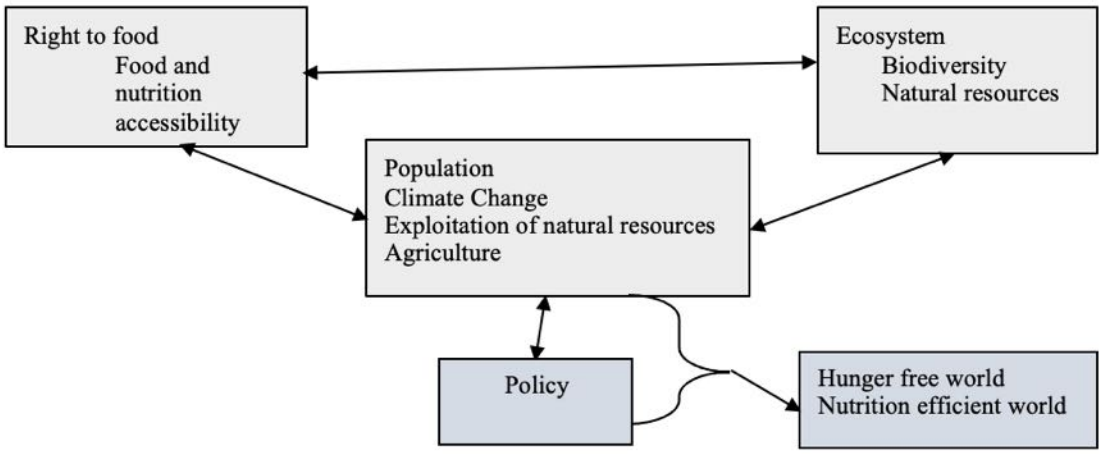

Figure 1: Conceptual Framework

CONCLUSION AND RECOMMENDATIONS FOR DEVELOPMENT

Despite the challenges outlined, the prospect of enhancing global food and nutrition accessibility remains viable, as data indicate that the world possesses the capability to produce a sufficient amount of food to adequately feed the entire population [3]. Nevertheless, it is crucial for the world to devise sustainable methods of food production to uphold the right to food for both present and future generations. The existing trajectory of food production is contributing to the degradation of natural resources and loss of biodiversity, exerting pressure on productivity and leading to diminished yields. Agricultural production must witness a global increase of approximately 60 percent by 2050, with a doubling required in developing countries, to fulfill the anticipated rise in demands for food and feed due to the expanding and evolving world population [3]. In light of the insights presented in this review paper, the following recommendations are proposed to ensure the right to food while safeguarding the ecosystem:

Formulate and implement policies and programs that integrate Human Rights into agricultural actions. Develop and implement policies that integrate human rights, particularly the right to food, into agricultural strategies by ensuring that policies address the complex relationship between food production, biodiversity conservation, and ecosystem health. This will also ensure avoidance of disjointed policies and programs that may hinder effective implementation and create

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Volume 24 No. 10
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ISSN 1684 5374

challenges for farmers and communities. Currently, there is a drive for agricultural policies that support intensive use of inputs and mechanisation even in rather fragile agroecological conditions [36]. The adoption of a comprehensive, holistic approach that acknowledges the intricate interconnectedness of all facets of our world is essential, albeit challenging to execute. This approach offers solutions that foster the sustainable management of natural resources, assist in mitigating the effects of climate change, ensure food security, and enhance access to nutrition [37, 38, 39]. Failing to embrace this transformative strategy would significantly jeopardize the world's ability to produce an adequate supply of food, particularly for those in marginalized communities and underrepresented gender groups.

1. Enhance Smallholder Inclusivity
   Recognize the crucial role of smallholder farmers in global food production and ensure inclusivity in policy development. This will ensure prioritization of the perspectives and expertise of smallholders, particularly in developing nations, and empowering them with resources and support for right to food and ecosystem conservation.

2. Promote Agroecology Adoption
   Encourage governments, international organizations, and communities to prioritize and promote the adoption of agroecology as a sustainable farming approach. This will require support of research, education, and training programs to empower farmers with the knowledge and skills needed for successful agroecological practices, as well as identify the best approaches that enhances right to food and ecosystem conservation. The actions should explore the broader spectrum of benefits offered by agroecology beyond climate resilience and greenhouse gas reduction, considering soil health, agroecosystem capacity, and long-term environmental sustainability. Agroecology has been critiqued on its limits to address larger structural entities [29]. There should be more studies on this to prove capacity of agroecology and find a solution to any limits that may be identified by the studies.

3. Educate and Raise Awareness
   Launch educational campaigns to raise awareness about the interconnectedness of the right to food and ecosystem conservation. This should target policymakers, farmers, and the general public to build a collective understanding of the importance of sustainable agricultural practices in ensuring food security and protecting the environment.

This comprehensive exploration delves into the intricate relationship between the right to food and ecosystem conservation, emphasizing the urgent need for

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transformative approaches to ensure sustainable food systems while safeguarding the environment. The right to food, rooted in international and national legal frameworks, is not just a moral imperative but a legally binding obligation, intricately linked to the well-being of individuals and the broader ecosystem. The analysis has revealed that human activities, particularly population growth, climate change, and intensive agricultural practices, exert significant pressure on natural resources, leading to biodiversity loss, soil degradation, and environmental sustainability challenges. The consequences of these activities reverberate across the globe, disproportionately affecting marginalized communities, smallholder farmers, and vulnerable populations.

In response to these challenges, this paper presents a series of recommendations aimed at fostering a more sustainable and inclusive approach to food production. Integrating human rights into agricultural policies, enhancing smallholder inclusivity, promoting agroecology adoption, and launching educational campaigns are identified as crucial steps. These recommendations emphasize the importance of recognizing the interconnectedness of the right to food and ecosystem conservation, acknowledging the pivotal role of smallholder farmers, and advocating for transformative, sustainable farming practices. Agroecology emerges as a key focal point in these recommendations, offering a holistic approach that not only enhances climate resilience but also contributes to biodiversity conservation, soil health, and long-term environmental sustainability. The multifaceted benefits of agroecology extend beyond immediate yields, encompassing its positive impact on soil quality and the overall efficiency and sustainability of agricultural practices.

In conclusion, achieving a balance between the right to food and ecosystem conservation requires a paradigm shift in global agricultural strategies. It demands a collective commitment to integrated, sustainable approaches that prioritize inclusivity, environmental stewardship, and the well-being of both present and future generations. The recommendations put forth in this paper serve as a blueprint for policymakers, practitioners, and stakeholders to collaboratively work towards a future where food security coexists harmoniously with ecosystem conservation, ensuring a sustainable and equitable world for all.

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ISSN 1684 5374

REFERENCES

1. **Office of the United Nations High Commissioner for Human Rights.** The Right to Adequate Food. United Nations, Geneva. 2010.

2. **Cafaro P, Hansson P and F Götmark** Overpopulation is a major cause of biodiversity loss and smaller human populations are necessary to preserve what is left. *Biological Conservation*. 2022; 272.

3. **FAO.** Post 2015 and SDGs: Nourishing People, Nurturing the Planet. FAO. 2014a.

4. **Global Network for the Right to Food.** The Right to Food and Nutrition Watch. 2020.

5. **Potts SG, Imperatriz-Fonseca V, Ngo HT, Aizen MA, Biesmeijer JC, Breeze TD and AJ Vanbergen** Safeguarding pollinators and their values to human well-being. *Nature*. 2016; **540:** 220-229.

6. **UN Millennium Project.** Halving Hunger: It Can Be Done. Routledge. London. 2005.

7. **Benton TG, Carling B, Helen H, Pudasaini R and L Wellesley** Food system impacts on biodiversity loss: Three levers for food system transformation in support of nature. Chatham House. 2021.

8. **IPBES.** Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. IPBES Secretariat. Bonn, Germany. 2019.

9. **Tilman D, Cassman K, Matson PA, Naylor R and S Polasky** Agricultural sustainability and intensive production practices. *Nature*. 2002; **418:** 671-677.

10. **Hilker T, Natsagdorj E, Waring RH, Lyapustin A and Y Wang** Satellite observed widespread decline in Mongolian grasslands largely due to overgrazing. *Global Change Biology*. 2013; **20(2):** 418-428.

11. **Herrero M, Mason-D'Croz D, Thornton PK, Fanzo J, Rushton J, Godde C and M Gill** Livestock and Sustainable Food Systems: Status, Trends, and Priority Actions. In J von Braun, K Afsana, LO Fresco and MH Hassan, Science and Innovations for Food Systems Transformation. 2023. 375-399.

12. **Griscom BW, Adams J, Ellis PW, Houghton RA, Lomax G, Miteva, DA and MR Hamsik** Natural climate solutions. *Proceedings of the National Academy of Sciences*. 2017; **114(44):** 11645-1650.

13. **FAO.** The state of food and agriculture: livestock in balance. Food and Agriculture Organisation of the United Nation. Rome. 2009.

14. **Poux X and PM Aubert** An Agroecological Europe in 2050: Multifunctional Agriculture for Healthy Eating. Findings from the Ten Years for Agroecology (TYFA) Modelling Exercise. Iddri-AScA. Paris. 2018.

15. **Ruhl JB** Farms, their environmental harms, and environmental law. Ecology Law Quartely. 2000. 263-264.

16. **Schreiber H and B Jones** Fisheries Policies and the Problem of Instituting Sustainable Management: The Case of Occupied Japan. 2015. In H Young and L Goldman. Livelihoods, natural resources and post-conflict peacebuilding. Routledge. 292-293.

17. **FAO.** State of world fisheries and aquaculture. FAO. 2014b.

18. **Berkes FP, Hughes TP, Steneck RS, Wilson, JA, Bellwood DR, Crona B and B Worm** Globalization, roving bandits, and marine resources. *Science*. 2006; **311:** 1557-1558.

19. **Kerr RB, Madsen S, Stüber M, Liebert J, Enloe S, Borghino N and A Wezel** Can agroecology improve food security and nutrition? A review, Global Food Security. *Global Food Security*. 2021; **29**.

20. **Gliessman SR** Agroecology: The ecology of sustainable food systems. CRC Press, Taylor & Francis. New York, USA. 2007.

21. **Telesetsky A** Fulfilling the human right to food and a healthy environment: is it time for an agroecological and aquaecological revolution? *Vermont Law Review.* 2016; **40:** 791-812.

22. **Pretty JN, Noble AD, Bossio D, Dixon J, Hine RE, de Vries FW and JI Morison** Resource-Conserving Agriculture Increases Yields in Developing Countries. *Environmental Science & Technology*. 2006; **40(4):** 1114-1119.

23. **Rapsomanikis G** The economic lives of smallholder farmers. An analysis based on household data from nine countries. Food and Agriculture Organization. Rome. 2015.

24. **Altieri MA, Nicholls C and F Funes** The scaling up of agro-ecology: Spreading the hope for food sovereignty and Resiliency: A contribution to Discussions at Rio+20 on issues at the interface of hunger, agriculture, and environment and social Justice. SOCLA's Rio+20 Position Paper. Rio. 2012.

25. **Hellin J and E Fisher** Building pathways out of poverty through climate-smart agriculture and effective targeting. Building pathways out of poverty through climate-smart agriculture and effective targeting. Development in Practice. 2018. 974-979.

26. **World Agroforestry Center.** Creating an Evergreen Agriculture in Africa for Food Security and Environmental Resilience. World Agroforestry Center. 2009. Nairobi.

27. **Inter-American Institute for Cooperation on Agriculture.** Bioeconomy and Production Development Program. Conceptual and methodological approaches for technical cooperation. Inter-American Institute for Cooperation on Agriculture. 2019.

28. **Adidja MW, Mwine J, Majaliwa JG and J Ssekandi** The Contribution of Agro-ecology as a Solution to Hunger in the World: A Review. *Asian Journal of Agricultural Extension, Economics & Sociology.* 2019; **33(2):** 1-22.

29. **Chappell, MJ, Bernhart A, Bachmann L, Gonçalves AL, Seck S, Nandul P and AC dos Santos** Agroecology as a Pathway towards Sustainable Food Systems. MISEREOR International Cooperation. Aachen. 2018.

30. **Holt-Giménez E** Measuring farmers' agroecological resistance after Hurricane Mitch in Nicaragua: a case study in participatory, sustainable land management impact monitoring. *Agriculture, Ecosystems and Environment.* 2002; **93:** 87-105.

31. **de Schutter O** Agroecology and the right to food. United Nations Human Rights Council Official Report. Geneva, Switzerland. 2002.

32. **Albanito F, Jordon M, Abdalla M, Mcbey D, Kuhnert M, Vetter S, Oyesiku-Blakemore J and P Smith** Agroecology – a Rapid Evidence Review. University of Aberdeen. Aberdeen, UK. 2022.

33. **Committee on Climate Change.** Land use: Policies for a Net-zero UK. Committee on Climate Change. 2020.

34. **Dittmer KM, Rose S, Snapp SS, Kebede Y, Brickman S, Shelton S, Cecelia E, Milena S and E Wollenberg** Agroecology Can Promote Climate Change Adaptation Outcomes Without Compromising Yield in Smallholder Systems. *Environmental Management.* 2023; **72:** 333-342.

35. **McAfee K** Sustainability and Social Justice in the Global Food System: Contributions of the Yale Workshop. In A Cohn, J Cook, M Fernández, R Reider and C Steward Agroecology and the Struggle for Food Sovereignty in the Americas. IIED, IUCN, CEESP and Yale F&ES. Nottingham, UK. 2006. 1-15.

36. **Silici L** Agroecology: What it is and what it has to offer. IIED. London. 2014.

37. **Carmona-Moreno C, Crestaz E, Cimmarrusti Y, Farinosi F, Biedler M, Amani A, Mishra A and A Carmona-Gutierrez** Implementing the Water–Energy–Food–Ecosystems Nexus and achieving the Sustainable Development Goals. UNESCO, European Union and IWA Publishing. 2021.

38. **FAO.** The State of Food and Agriculture 2022. Leveraging Automation in Agriculture for Transforming Agri-Food Systems. Food and Agriculture Organization of the United Nations. Rome. 2022.

39. **Vargas DC, Hoyos C and OL Manrique** The water-energy-food nexus in biodiversity conservation: A systematic review around sustainability transitions of agricultural systems. *Heliyon*. 2023; **9(7)**.