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Original articles

Social Justice and Sustainability of Peasant Family Farming

Justicia social y sostenibilidad de la agricultura familiar campesina

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Abstract

Peasant family farming in Ecuador is responsible for producing over two-thirds of the food required to sustain the country's nutrition and significantly contributes to agricultural exports. Despite this, rural areas in Ecuador experience the highest levels of poverty, leading to widespread undernutrition, particularly among pregnant women and infants. This stark disparity presents a social justice issue that demands urgent attention. Some analysts argue that the inefficiencies of peasant agriculture contributes these issues, labelling it as unsustainable due to its perceived low productivity and profitability. However, such assessments often overlook the sector's crucial role in food security, biodiversity preservation, and environmental balance. Family farming sustains local food supplies and promotes ecological stability through diverse, sustainable practices. Public policy orientation, particularly in support of small-scale farmers, is essential in determining these rural communities' sustainability and improved livelihoods, especially in the face of increasing pressures from modern corporate agriculture. Addressing these structural inequalities is key to ensuring that peasant family farming is economically viable, socially just, and environmentally sustainable.

Summary: Introduction, Method and Methodology, Analysis and Results, Discussion of the Results, Conclusions.

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Keywords: social problems, rural environment, rural emigration, sustainability, food supply, biodiversity, multi-cropping.

Resumen

La agricultura familiar campesina en Ecuador es responsable de producir más de dos tercios de los alimentos necesarios para sostener la nutrición del país y contribuye significativamente a las exportaciones agrícolas. A pesar de ello, las zonas rurales en Ecuador experimentan los niveles más altos de pobreza, lo que conduce a una extendida desnutrición, especialmente entre mujeres embarazadas y niños. Esta marcada disparidad representa un problema de justicia social que exige atención urgente. Algunos analistas argumentan que las ineficiencias de la agricultura campesina contribuyen a estos problemas, calificándola como insostenible debido a su aparente baja productividad y rentabilidad. Sin embargo, tales evaluaciones a menudo pasan por alto el papel crucial del sector en la seguridad alimentaria, la preservación de la biodiversidad y el equilibrio ambiental. La agricultura familiar sostiene el suministro local de alimentos y promueve la estabilidad ecológica a través de prácticas diversas y sostenibles. La orientación de las políticas públicas, en particular el apoyo a los pequeños agricultores es esencial para determinar la sostenibilidad de estas comunidades rurales y la mejora de sus condiciones de vida, especialmente frente a las crecientes presiones de la agricultura corporativa moderna. Abordar estas desigualdades estructurales es clave para asegurar que la agricultura familiar campesina sea económicamente viable, socialmente justa y ambientalmente sostenible.

Palabras clave: problemas sociales, entorno rural, emigración rural, sostenibilidad, suministro de alimentos, biodiversidad y policultivo.

Introduction

Family farming, a system of small-scale agricultural production, starkly contrasts with the modern "conventional" agriculture that dominates developed nations. While conventional agriculture emerged alongside the rise of industrial capitalism, characterized by capital-intensive practices and monoculture, family farming remains rooted in diverse, labor-intensive, and subsistence-oriented practices. This form of agriculture is crucial in food security, biodiversity conservation, and rural livelihoods globally and within Ecuador. Thus, this type of agriculture is not only a phenomenon of low-income nations; Central European countries and other developed countries, such as Japan, for decades have also favored this type of agriculture, which exists, to a greater or lesser extent, throughout the world (Mazoyer, 1997).

Historically, the shift from feudal systems to modern capitalism, particularly following the Industrial Revolution, significantly altered global agricultural practices. The enclosure movement in England, which privatized communal lands and displaced peasant labor to urban centers, marked the beginning of large-scale commercial agriculture. With innovations like the internal combustion engine and the steel plow in the 19th century, agriculture became increasingly mechanized and specialized in monocultures—large tracts of land dedicated to single crops, aiming to maximize profits and land rent (Marx [1867] 1990). This transformation entrenched capitalism as the dominant economic system, separating landowners and capitalists from the labor force, which increasingly migrated to cities.

In the 20th century, as colonial empires dissolved, a new global division emerged. The so-called developed countries began to differentiate themselves from the undeveloped countries, as described by Hobsbawm (1989) and as explained by Wallerstein (1980) in his work. This event has two marked consequences. Developed countries seeking to secure

agricultural production turned to plantation agriculture in former colonies. This form of agriculture, which closely mirrors the capital-intensive model seen in industrialized nations, primarily serves global commodity markets (Ferrer, 2000). However, within many developing countries, including Ecuador, a large segment of the rural population remains engaged in small-scale, subsistence-oriented family farming. This mode of production, marked by its reliance on the labor of peasant families, has persisted despite continuous economic and social challenges (Mançano Fernandes, 2014).

Family farming differs fundamentally from commercial monoculture in several key ways. First, it operates on small and medium-sized plots of land, where production is geared toward self-sufficiency rather than profit maximization. These farms are often characterized by polyculture, growing multiple crops to ensure food security and resilience. This multi-crop system starkly contrasts with the monoculture model of modern agriculture, which focuses on the large-scale production of a single commodity.

Family farming lacks financial capital and depends on multiple crop production. Without significant investments, these farms rely on the labor of peasant families and the surrounding community, creating a social system based on reciprocal labor rather than monetary exchange. This system supports the economic survival of these families and fosters strong community ties and mutual aid.

Additionally, it is important to highlight that these minority groups of family farming contribute significantly to biodiversity. Unlike monoculture, which often depletes the soil and reduces ecological diversity, family farming integrates natural ecosystems into its production processes. Peasant farmers maintain diverse crops and rely on the natural environment, such as wild plants and traditional irrigation methods, to support their agricultural activities. This biodiversity is crucial for the sustainability of family farming, as it provides resilience against environmental and economic shocks (Espinel, 2006).

However, family farming is often associated with poverty and social marginalization despite its sustainability and food security contributions. Peasant families, particularly in countries like Ecuador, frequently experience low incomes, limited access to basic services, and exclusion from broader economic opportunities (Espinel, 2010a; Milanovic, 2011). These issues raise important social justice concerns, as these communities are disproportionately affected by policies and economic systems that favor large-scale commercial agriculture.

This study investigates the significance of peasant family farming in Ecuador, exploring its contributions to sustainability, biodiversity, and rural livelihoods. It also seeks to understand the social justice issues that impact these farming communities, particularly regarding income inequality, access to resources, and the marginalization of peasant farmers. By examining these factors, this research will highlight the importance of preserving and supporting family farming as a key component of sustainable agricultural development in Ecuador.

Literature Review

It is essential to understand any concept and previous research regarding social justice, food chain sustainability, and the role of peasant family farming and commercial agriculture in the context of the field discussed in the current study. Besides, looking into other investigations with similar objectives as confirmatory references helped the orientation of the current research.

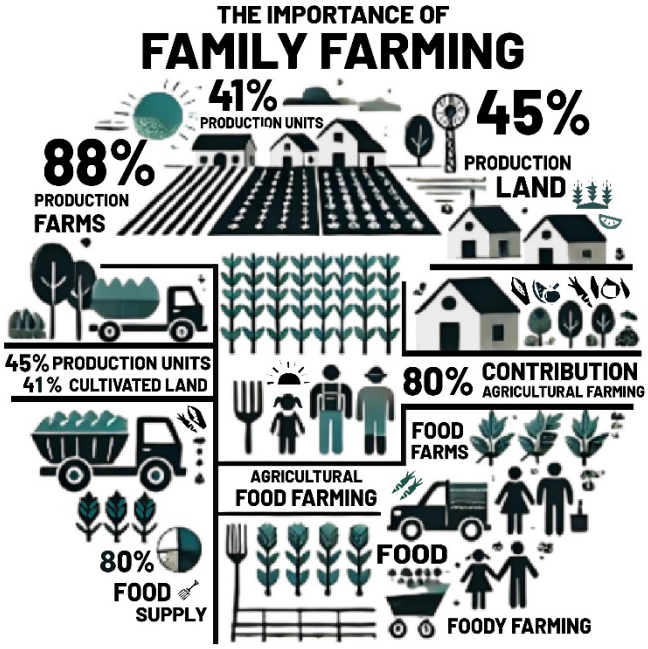
The role of family farming

Family farming is essential to Ecuador's agricultural landscape, representing 88% of the country's production units and covering 41% of its cultivated land. According to the Agricultural Census of Ecuador in 2000, family farming contributes approximately 45% of the total agricultural production in the country, and it significantly supports Ecuador's food security and rural livelihoods. This sector not only plays a vital role in domestic consumption, accounting for 80% of the country's food supply but also supports 747,000 households, equating to 26% of Ecuador's total population. It represented 29.4% of the economically active population and generated 26.8% of employment, according to the National Statistics Institution data (INEC, 2021) [see Figure 1].

The family farming model contributes approximately 4.05% to Ecuador's GDP from the 9% of the agriculture contribution, and its importance extends beyond its economic contributions. Family farms are small to medium-sized, averaging 7 hectares, and employ different levels of labor depending on their classification. These farms provide subsistence for families and, in many cases, are essential for maintaining local economies. The model is characterized by its low reliance on hired labor, with subsistence farms relying entirely on family labor and other farms occasionally hiring external workers (Wong, 2009).

Figure 1

Peasant Family Farming Production



Despite its critical role, family farming is closely associated with rural poverty in Ecuador. The most recent statistics indicate that, in 2021, 42.96% of the rural population lived below the poverty line, with 20.3% in extreme poverty (INEC, 2021). Family farmers, particularly those operating on smaller plots of land, face significant economic challenges. They often rely heavily on off-farm income, with the smallest farms deriving up to 32% of their income from non-agricultural activities. This disparity highlights the vulnerability of small farmers, who struggle to sustain themselves in agriculture alone.

Adding to the social justice issue, the poverty rates in Ecuador's rural areas have worsened, particularly in provinces like Los Ríos, Manabí, and Esmeraldas, which are among

the country's most impoverished regions. The unequal distribution of land and resources, alongside the lack of a comprehensive rural development program, exacerbates these inequalities. Ecuador has one of the worst land distribution ratios in Latin America, with a Gini coefficient of 0.81, highlighting the stark contrast between wealthy landowners and impoverished rural communities (Espinel, 2010a). These systemic inequities between countries which affect large groups of producers, especially in the agricultural sector (Milanovic, 2013), reflect a larger issue of social justice, where the contributions of family farmers are undervalued, and they receive minimal support for sustainable development.

Family farming and biodiversity in Ecuador

Family farming plays a critical role in Ecuador, not only in food production but also in maintaining biodiversity. Peasant agriculture is characterized by crop diversity, which is essential for ecological sustainability. Even the smallest family farms, averaging around 0.5 hectares, cultivate various plant species—sometimes as many as a dozen. This biodiversity helps ensure the resilience of these farming systems and protects the environment from the impacts of monoculture (Espinel et al., 2006). Unlike large commercial farms, most family farming production is not marketed, with less than 30% of the produce sold, except in consolidated family farms. The remaining crops are consumed by the family or exchanged locally, forming part of a communal economy that operates largely outside of formal markets.

Family farming also relies on internal labor, as most farms lack the resources to hire external workers. Often based on mutual aid, labor exchanges strengthen community ties and ensure that farming operations continue even without monetary income. Bartering remains a vital component of rural economies, with labor being exchanged for goods and services, especially in subsistence farming. Local examples, such as farmers exchanging rice for seedlings in the Abras de Mantequilla sector, illustrate the importance of these reciprocal systems in rural Ecuador (Espinel et al., 2006).

This biodiversity-based agricultural model is an essential survival strategy for small farmers. The multi-cropping system that characterizes peasant agriculture[1] is mixed cropping, or the cultivation of different species within the same plot, which has allowed family farms to withstand market fluctuations and environmental challenges. By diversifying their crops, small-scale producers protect their families from food insecurity. This agricultural practice fosters biodiversity and helps preserve essential ecological systems, such as soil health, pollination, and water retention, which are crucial for sustainable farming (Wilkes, 1987). For example, the former author mentioned that Mexican peasant producers rely on nature's support to produce their plots due to the scarcity of capital. Thus, trees and shrubs are conserved to act as windbreaks, certain plants with a root system help retain moisture in the soil, birds and insects are preserved to promote the pollination of plants that are not nearby, and other species have medicinal properties for family use, some are decorative, and others allegedly ward off evil spirits[2].

On the other hand, the monoculture model has evolved primarily through genetic selection and improvement. It gained significant productivity through the Green Revolution, where the development of plant varieties through hybridization methods allowed for the widespread use of chemical inputs and irrigation systems (Hesser, 2009). The remarkable achievements obtained in maize and wheat at CIMMYT in Mexico and in rice at the IRRI in the Philippines set the stage for the development of modern agriculture based on the

[1] This topic has been addressed for decades in several studies one can review (Espinel, 1991), which was part of his doctoral dissertation at the University of California, Berkeley.
[2] For further reference to cases observed in Ecuadorian agriculture, see (Espinel, 2009).

combination of large land areas and capital under the monoculture system (Mann, 2018). The research and development of modern agriculture have evolved since the Green Revolution, based on input-intensive technology that allowed plants to tolerate large amounts of fertilizers, insecticides, herbicides, and even high volumes of irrigation water. However, the technology of the Green Revolution soon generated alarm among environmental and social activists, such as Carson (1962) and Shiva (2016), due to its environmental and social impacts. The breakthrough occurred with knowledge technology, which prevails in agriculture today. This technology relies on using mathematics, information technology, and genetics, requiring high-capacity and high-speed computers, which have enabled the sequencing of plant genomes upon which modern biotechnology is based. As a result, research processes today are referred to as "in silico," indicating that plant biology is now guided by applied mathematics, statistics, informatics, and robotics (Espinel, 2005).

Overall, despite the importance of the practices of multi-cropping systems from peasant agriculture versus monoculture agriculture, they have been poorly studied, especially in comparison to the modern commercial agriculture model, which often prioritizes monoculture and technological innovation over ecological sustainability (Bardel et al., 2008).

Modern Commercial Agriculture and Peasant Agriculture Divergence

In recent years, the conversation around agricultural development has largely focused on the tension between modern commercial agriculture and family peasant agriculture. Modern commercial farming, often supported by genetic engineering, large-scale monoculture, and capital-intensive production, prioritizes high productivity and market efficiency. Companies such as Plant Genetic Systems and Monsanto have invested significantly in technologies like the transgenic insertion of the bacterium Bacillus thuringiensis in cotton plants, known as “Bt Technology," to control the bollworm insect and "Roundup Ready" soybean seeds to elicit the use of herbicides in soy crops, which deliver short-term productivity gains but raise long-term concerns over environmental sustainability and social equity (Robin, 2008).

On the other hand, family peasant agriculture is built on principles of environmental harmony, using time-honored practices that prioritize biodiversity and ecological sustainability. These small-scale farms rely on traditional methods such as recycling waste, using natural fertilizers, and employing manual crop selection, making them an integral part of local ecosystems. As highlighted by Tisdell (2005), peasant agriculture plays a critical role in maintaining soil fertility and local biodiversity, which are often undermined by the mechanized processes of commercial monoculture.

The rise of organic agriculture has created a niche for family farming in the global market, where consumers are increasingly willing to pay premiums for food perceived as more natural, healthier, and closer to the environment (Roep & Wiskerke, 2007). This shift in consumer behavior has brought attention to the ecological and cultural benefits of smallholder farming, as opposed to the capital-driven, monoculture-based commercial agricultural model.

Production and Productivity in Family Farming

Family farming is often critiqued for its low productivity, especially compared to modern commercial agriculture. This view perpetuates that small farms are inefficient and struggle to compete in a market dominated by large-scale, high-output agricultural enterprises. Critics argue that family farmers' inability to produce at the scale of industrial farms leads to higher food prices, as farmers must charge more to cover their production costs. McMurtry (1998) explains that this economic disparity creates a vicious cycle in which small farmers are marginalized by a system that values efficiency and productivity at the expense of equity and sustainability.

Agricultural marketing and markets are other aspects considered issues related to the production volume rather than productivity itself, with the intention to promote bilateral agreements between economies. The trend in the relationship with developed countries has been towards establishing bilateral agreements to promote trade. Free trade agreements imposed by the North were presented as an alternative. However, as Munck (2005) explains in his work on globalization and social exclusion, it has become evident that the asymmetry between economies of unequal weight can have disastrous effects on less developed and vulnerable economies. In the case of Ecuador, Wong (2009) analyzes the impact of free trade agreements on family farming and sheds light on the issue.

In countries like Ecuador, it is found that a significant portion of the production from small rural producers is lost due to post-harvest handling. According to Dufumier (2004), these losses can average up to forty percent for perishable products and sixteen percent for grains. This matter is primarily due to the poor organization of agri-food chains, which affects peasant production.

On the other hand, agricultural policies in Latin America tend to reinforce these assumptions by favoring monoculture and large-scale farming. Hidalgo (2014) describes the dominant discourse in the region, where development is synonymous with capitalist enterprise, and peasant farming is seen as backward. This viewpoint leads to policies that disproportionately benefit large commercial farms, further widening the gap between industrial agriculture and family farming. However, as scholars like Espinel (2010b) point out, these narratives overlook the structural economic forces perpetuating poverty among small-scale farmers and undervalue the unique contributions of family farming.

Method and Methodology

This section describes how the study employs a social constructivism paradigm, emphasizing the role of societal context in shaping the realities of family farmers. The methodology uses a mixed method, mostly a qualitative viewpoint, for analyzing systematic literature reviews (SLR). Some quantitative evaluations are taken from statistical bureaus such as the National Statistics Institution, Instituto Nacional de Estadísticas y Censos (INEC), and the Central Bank of Ecuador. Previous studies, the SLR, and statistical-related data were analyzed, aiming to confirm the arguments of the main researcher's field investigation that need to be expanded upon, linking it to previous works (e.g., Wilkes, 1987, on biodiversity and smallholder agriculture, and Espinel, 2018).

As part of the methodological strategy, the guiding Table 1, creates and identifies the topics involved in this research and the scope for each topic, facilitating the criteria to identify sources for the SLR and Statistics data, useful to accomplish the proposed described scopes and the outcomes that needed to be discussed to accomplish the aim of the current study.

Table 1

Topics to identify sources for the SLR and Statistics data Analysis

TOPIC	SCOPE	DESCRIPTION OF SCOPE	AIMED OUTCOME FOR DISCUSSION
Family Farming	Importance/role of Family Farming	Identify literature and statistical data regarding the contribution of family farming to Ecuador's agricultural output, population involvement, and impact on food security.	Economic Contributions and Challenges of Family Farming
Biodiversity	Family Farming and Biodiversity	Identify literature and statistical data to discuss how family farms contribute to biodiversity preservation and food sustainability through mixed cropping systems.	The Social and Environmental Impacts of Family Farming

TOPIC	SCOPE	DESCRIPTION OF SCOPE	AIMED OUTCOME FOR DISCUSSION
Agriculture	Modern Commercial Agriculture vs. Family Peasant Agriculture	Identify literature and statistical data to explain how large-scale commercial agriculture differs from family farming in production, environmental impacts, and societal outcomes.	Biodiversity, Innovation, and Social Justice in Family Farming
Production	Production and Productivity in Family Farming	Identify literature and statistical data to discuss the misconceptions about productivity in family farming, showing how efficiency is miscalculated when focusing on commercial methods.	The Complexity of Measuring Productivity in Family Farming
Social Justice	Social Justice in Peasant Family Farming	Identify literature to address the poverty and inequity experienced by peasant families, underlining the disparities in land ownership and the challenges posed by modern agricultural policies.	Implication of all the scopes in Social Justice for Peasant Family Farming

Analysis and Results

The results of this study build on the extensive body of literature that highlights the critical role of family farming in promoting food security, biodiversity, and rural livelihoods, particularly in developing countries like Ecuador. Statistical data from national agricultural surveys and global reports underscore the economic and environmental contributions of family farming, which represents approximately 80% of all farms worldwide and produces over half of the world's food supply (FAO, 2014). Despite these contributions, family farmers often face structural disadvantages, including limited access to land, financial resources, markets, and socio-economic inequalities that hinder their ability to thrive.

This section examines the social justice issues affecting family farming in Ecuador, using empirical data to assess the sector's challenges about land inequality, poverty levels, and access to resources. The findings consider the aimed outcome for discussion proposed in Table 1 to provide a nuanced understanding of how the identified issues intersect with sustainability, offering insights into the need for targeted policies that support small farmers and promote equitable agricultural development.

Economic Contributions and Challenges of Peasant Family Farming

Family farming contributes to Ecuador's economy, impacting food security, employment, and rural development. It is responsible for a significant portion of the country's agricultural output, especially in key crops like rice, coffee, corn, and tomatoes. It employs 29.4% of the economically active population (INEC, 2021). However, in some cases, particularly for very small farms, much of the production—nearly 70%—is consumed locally, and only a third of it is sold in markets, limiting the ability of family farmers to generate significant income from their work (Espinel et al., 2006).

The reliance on local consumption underscores the undervaluation of family farming's output. While vital to food security, this production is often not accounted for in official market transactions, leading to a skewed perception of the sector's productivity and economic value. Additionally, the costs associated with family farming, including purchasing fertilizers and pesticides, further strain small farmers' already limited financial resources. These expenditures highlight the sector's struggle to access quality inputs, as many farmers resort to recycling seeds, which negatively impacts crop yields.

Despite these challenges, family farming remains crucial for Ecuador's economy, contributing around $4.5 billion, about half of the agricultural GDP. However, the average productivity per hectare, while significant, varies widely due to inconsistencies in data collection and land tenure. Family farmers often operate on small plots of land, averaging just

0.47 hectares per unit, limiting their ability to scale up production and compete with large commercial farms (INEC, 2021).

One of the most pressing issues family farmers face is the lack of social justice in land distribution and agricultural policy. Ecuador's rural development policies have historically favored large-scale commercial agriculture, disadvantaging family farmers. The failure of the agrarian reform program in the 1970s, which aimed to redistribute land more equitably, has left small farmers without secure property rights or access to the resources needed to improve their livelihoods. As a result, rural poverty persists, and the benefits of Ecuador's agricultural growth are disproportionately concentrated among wealthy landowners (Espinel, 2010a).

The Social and Environmental Impacts of Family Farming on Biodiversity

Family farming's reliance on biodiversity creates several social and environmental benefits, which are often overlooked in traditional economic analyses. The smallholder farms that dominate rural Ecuador produce food in a manner that sustains the environment while also fostering social justice. The mixed cropping systems employed by peasant farmers ensure food security for individual families and preserve various living organisms, from plants to animals and microorganisms. This diversity is vital for maintaining the ecological balance of farming regions, as it reduces the need for external inputs, such as chemical fertilizers and pesticides, which can harm the environment (Martínez Allier, 2004).

Furthermore, preserving biodiversity on small farms is directly related to social justice. Family farmers, particularly those in rural Ecuador, are often marginalized by national policies that favor large-scale commercial agriculture. These farmers have limited access to financial resources, technological innovations, and markets, which forces them to rely on traditional farming methods. The resistance of peasant agriculture to accept some current agricultural techniques and modernization attempts, often dismissed by economists as risk aversion, is, in fact, a rational response to the needs of the local environment and the socio-economic realities of rural communities, that is more a decision to preserve an ancestral form of organization and efficiency within their farms (Schultz, 1964; Popkin, 1979)[3].

While large-scale agriculture benefits from government subsidies and technological advancements, family farming is undervalued and under-supported. For decades, peasant farmers have been forced to rely on nature's services, such as birds for pollination and trees for windbreaks, due to a lack of capital for more modern farming technologies (Wilkes, 1987). Despite these constraints, family farming systems have proven to be remarkably resilient. Their reliance on biodiversity allows them to adapt to environmental changes and market fluctuations in ways that large monoculture farms cannot.

However, these traditional practices are under threat. As global agricultural policies continue to push for industrialized farming models, the ecological and social benefits of family farming are being eroded. Modernization efforts that encourage monoculture and heavy reliance on external inputs often fail to consider the long-term sustainability of these systems. Historically contributing to preserving biodiversity and protecting ecosystems, family farmers risk being displaced or marginalized by policies prioritizing short-term economic gains over ecological resilience.

Biodiversity, Innovation, and Social Justice in Family Farming

Family peasant agriculture fosters biodiversity in ways that large-scale commercial agriculture cannot. For instance, on small farms, production is not exclusively market-driven;

[3] Extensive discussions on this topic can be found in McMurtry's (1998) and Bartra (2006) works.

much of the produce is used for local consumption, often exchanged through labor or goods bartering systems within communities (Espinel et al., 2006). These farming systems typically involve a combination of crops, animal husbandry, and aquaculture, contributing to a highly diverse environment that sustains the family and the ecosystem. Studies have shown that family farms rely on practices such as multi-cropping, which protect against environmental risks and market fluctuations, ensuring greater food security for small-scale producers (Martínez Allier, 2004).

The interaction between family farming and biodiversity is mutually reinforced. For example, using "bioles," or organic teas made from recycled farm waste, has been found to have hormonal effects that boost plant immunity, enhancing crop resilience against pests and diseases. The Biotechnological Research Center (CIBE) at ESPOL in Guayaquil has made significant progress in studying bioles in cocoa farms of Guayas; the use of bioles led to a dramatic increase in yields—from 300 pounds to over two metric tons per hectare—without resorting to harmful chemical pesticides. This innovation exemplifies how peasant farming practices can increase productivity while maintaining ecological balance.

Despite its advantages, family farming is marginalized in global agricultural policy, which often prioritizes large-scale commercial farms. The lack of support for family farmers exacerbates social justice issues, particularly regarding access to resources and property rights. As has been noted elsewhere (Espinel, 2018), the survival of family peasant agriculture depends on its biodiverse environment, and conversely, biodiversity in agricultural areas is sustained by family farms. Policies that favor monoculture and genetic engineering often overlook this symbiotic relationship, leading to market failures that result in the exploitation of rural communities and the erosion of biodiversity.

Moreover, there is a significant disparity in the treatment of intellectual property rights in agriculture. Large corporations that engage in genetic engineering often extract genetic material from biodiverse regions—many of which are cultivated by small-scale farmers—without proper recognition or compensation for the original custodians of that biodiversity (Van Huylenbroeck & Espinel, 2007). This practice raises critical concerns about the privatization of genetic resources and the exclusion of rural farmers from the benefits of technological advancements.

The Complexity of Measuring Productivity in Family Farming

Family farming differs fundamentally from the monoculture model that dominates conventional agriculture. As a result, productivity metrics that work for large farms are misleading when applied to small-scale farming. Conventional farms often comprise hundreds of hectares of a single crop, making measuring output in tons or kilograms per hectare easy. In contrast, family farms—typically less than 5 hectares—are polyculture, growing crops in small, mixed plots (Salcedo & Guzmán, 2014). Measuring productivity by crop output alone fails to capture the ecological, economic, and social benefits of family farming.

One critical factor in understanding family farm productivity is energy efficiency. Rather than relying on external inputs like chemical fertilizers and pesticides, peasant farmers often use local resources to maintain their farms. These practices include recycling organic waste, using natural fertilizers, and employing manual labor from the family or community, resulting in a more sustainable and efficient energy balance than in large-scale commercial farms (Espinel, 2018). Using local inputs reduces costs and fosters greater resilience in economic and environmental challenges.

Another important consideration is that family farming often produces for self-consumption or local markets. A significant portion of the output from small farms is used to feed the farmer's family or is exchanged within local economies through bartering systems. These aspects make family farms less reliant on external markets and buffer them against price fluctuations. However, it also means that much of their productivity goes unrecorded, as it does not go through formal market channels. This aspect of family farming is often overlooked by policymakers, who equate success with the ability to produce for global markets.

The misconception that family farming is unproductive is further perpetuated by agricultural policies shaped by the Green Revolution. These policies have historically promoted the adoption of technologies—such as chemical inputs and mechanization—developed for large-scale monoculture. However, these technologies are often inappropriate for small-scale polyculture farms and can undermine their sustainability by introducing chemicals that degrade soil health and reduce biodiversity. As de Janvry et al. (1995) argue, agricultural policies that ignore the unique needs of small farmers exacerbate rural poverty and fail to capitalize on the strengths of family farming systems.

Nevertheless, it is feasible to initiate rural development programs to enhance production conditions, productivity, and market dynamics in specific areas that could be considered pilot initiatives to adopt this approach. Implementing programs that favor the development of family peasant agriculture requires a first step to improve the livelihood of the people in rural areas in order to provide basic principles of justice as established by John Rawls in part two of his book "Justice as Fairness" (Rawls, 2001), also following suggestions enquiring the reasons why poorest countries are falling behind and what can be done about it (Collier, 2007).

Discussion of the Results

Addressing social justice in Ecuador's family farming sector reveals the vital role of small-scale farmers in the agricultural landscape and their substantial challenges. Family farming is critical to Ecuador's food security, rural employment, and local economies. However, the sector is plagued by significant social justice issues, including poverty, land inequality, and restricted access to essential resources. These problems highlight the structural disadvantages that small farmers experience, with their contributions to food production and biodiversity often undervalued and excluded from broader economic development benefits.

To combat these social justice challenges, Ecuador must adopt policies prioritizing family farming as a cornerstone of sustainable development. Improved access to land, water, infrastructure, and targeted support for increasing productivity and income could alleviate some of the burdens small-scale farmers face. Equitable agricultural policies should also address the historical imbalances that have marginalized rural communities, particularly regarding land distribution and the absence of rural development programs. By fostering these changes, Ecuador can ensure that small farmers are included in and benefit from the nation's economic growth.

Family farming's importance extends beyond food production and is intrinsically tied to biodiversity preservation. Peasant farmers in Ecuador, typically excluded from the benefits of modern agricultural development, are at the forefront of maintaining ecological systems. Their reliance on biodiversity is an environmental strategy and a means of survival, supporting food security and sustainable practices within their communities. However, without adequate government support, biodiversity and these farmers' livelihoods are at risk.

Ecuador must reorient its agricultural policies to favor family farming to support biodiversity and promote social justice. These policies include providing financial resources, access to sustainable technologies, and recognizing the value of traditional farming methods prioritizing ecological balance. Ecuador can ensure environmental conservation and social equity by supporting small-scale farmers through biodiversity-friendly policies. Family farming should be viewed as a central pillar of a just and sustainable society, where protecting ecological diversity also safeguards the livelihoods of rural communities.

The gap between commercial agriculture and family farming also underscores deeper social justice issues. Peasant farmers face barriers limiting their access to markets, technologies, and fair compensation for their biodiversity and food security contributions. As modern agriculture becomes more advanced than peasant family farmers, agricultural policies must protect the rights of small farmers, ensuring they benefit from technological progress and market access.

Achieving socially just agricultural policies requires recognizing family farming's role in biodiversity conservation and rural livelihoods. Legislation must protect the intellectual property of small farmers, ensuring they benefit from genetic resources and technological advancements. Infrastructure investment is also needed to enable family farmers to compete in local and global markets. Ultimately, by addressing these structural inequalities and prioritizing sustainability and equity, agricultural policies can ensure that family farming remains a key part of Ecuador's economic and environmental future.

Conclusions

In conclusion, family farming in Ecuador plays a crucial role in food security, biodiversity conservation, and rural livelihoods. Family farmers face significant social justice challenges despite these contributions, including poverty, land inequality, and exclusion from broader economic benefits. Addressing these issues requires policies that support family farming as both an economic pillar and a sustainable agricultural model. By improving access to land, resources, and infrastructure, Ecuador can empower small farmers to increase their productivity and income while preserving ecological systems.

Social justice in agriculture is an economic necessity and a matter of human rights. Recognizing the value of family farming and integrating traditional practices into agricultural development strategies will promote environmental sustainability and social equity. Future agricultural policies must prioritize the needs of family farmers, ensuring that they are included in technological advancements and market opportunities. This approach will reduce rural poverty and strengthen Ecuador's food security and biodiversity.

Future Research Directions

Future research should focus on enhancing social justice within peasant agriculture to improve food security and reduce poverty. This continued study should explore policy frameworks that increase market access, sustainable technologies, and financial resources for family farmers. Further studies could also examine the role of biodiversity in family farming systems, identifying how traditional practices can be integrated into national agricultural strategies to foster resilience against climate change. By deepening the understanding of these issues, future research can help create more inclusive and sustainable agricultural policies that benefit rural communities and the environment.

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