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Agrarian Flux: Reexamining Traditional Agricultural Practices in the Context of Environmental Justice and Agroecology

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Abstract
Agriculture has profoundly shaped human societies and ecosystems, sustaining life while simultaneously contributing to biodiversity loss and environmental degradation through chemical-intensive and standardized farming practices. This article explores the concept of "agrarian flux," a dynamic interplay of agricultural expansion, intensification, and abandonment, which has led to significant socio-ecological transformations. Focusing on Punjab, India, a region emblematic of the Green Revolution's successes and failures, this study examines how modern farming practices have marginalized traditional knowledge, exacerbated ecological crises, and deepened social inequalities. Employing a mixed-methods approach, including ethnographic fieldwork the research highlights the need to integrate environmental justice and agroecological principles into agricultural systems. By addressing the socio-economic, cultural, and ecological dimensions of agrarian change, this article advocates for a paradigm shift toward sustainable, inclusive, and localized farming practices that prioritize food sovereignty and ecological resilience.

Introduction

Agriculture has been a cornerstone of human civilization, providing sustenance while reshaping landscapes and ecosystems. However, the intensification of farming through chemical inputs, mechanization, and monoculture practices, particularly since the Green Revolution, has led to significant ecological and social costs. In Punjab, India, the Green Revolution transformed the region from food-scarce to food-surplus, but at the expense of environmental degradation, farmer indebtedness, and declining social cohesion (Bhattacharya, 1985; Singh et al., 2008). The term "agrarian flux" encapsulates the dynamic and often contradictory transformations in agriculture, characterized by expansion in some regions, stagnation in others, and the marginalization of traditional practices amidst global pressures for commodification and modernization (Perfecto et al., 2019).

This article examines the interplay between agrarian practices and environmental justice, arguing that the Green Revolution's focus on productivity has overlooked ecological costs, leading to erratic rainfall, polluted resources, and health crises (Pingali, 2012). By analyzing the socio-ecological consequences of modern farming in Punjab, this study highlights the structural inefficiencies that prioritize economic gains over ecological sustainability. It further explores how traditional and agroecological practices are sidelined by market-driven agriculture, exacerbating vulnerabilities for smallholder farmers, women, and landless laborers. The research questions the homogenization of agricultural practices and advocates for a pluralistic approach that integrates local knowledge, biodiversity, and equitable resource distribution to address the agroecological question.

Methodology

Field Sites

This study focuses on four villages in S.A.S. Nagar, Mohali, Punjab—Shafipur, Nadiali, Rurka, and Dharamgarh—selected for their diverse populations and proximity to urban expansion, which has driven skyrocketing land prices and the conversion of fertile land to commercial use (Indian Express, 2023). These villages provide a unique lens to examine agrarian flux amidst rapid socio-economic and ecological changes.

Methods and Tools

The research employs a mixed-methods approach, combining ethnographic fieldwork with qualitative data collection to capture the dynamic and multifaceted nature of agrarian relations. Initial data collection involved unstructured interviews aligned with the study's objectives, supplemented by field notes, audio recordings (with participant consent), and photographs. However, due to participants' discomfort with recording devices, the researcher prioritized field observations, in-depth listening, and oral histories. Focus group discussions with farmers, personal and telephonic conversations with agricultural experts, and meetings with NGOs, Krishi Vigyan Kendras (KVKs), and village leaders enriched the dataset. Pilot studies identified key sites of agrarian activity, such as irrigation setups, agricultural markets, and festival gatherings, where seasonal and cultural dynamics shaped participant interactions.

To understand ecological changes, oral histories and case studies provided insights into long-term environmental shifts, while the Knowledge, Attitudes, and Practices (KAP) framework was used to analyze the impact of market forces on farm outputs, socio-economic worth of laborers, and farmers' autonomy in production decisions. Participants included traditional farmers, new farmers, and landless laborers, ensuring a broad representation of perspectives.

Theoretical Framework: From Agrarian Question to Agroecological Question

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The agrarian question, historically centered on land, labor, and capital, has evolved into an agroecological question that encompasses social, economic, cultural, and ecological dimensions (Pimbert, 2015). The Green Revolution, while increasing agricultural productivity, introduced industrial practices that disrupted symbiotic relationships between agriculture and ecosystems, leading to soil degradation, water pollution, and biodiversity loss (Sarkar & Das, 2014; Bag, 2021). These externalities have rendered agriculture unsustainable, with Punjab's Malwa belt, for instance, facing a health crisis linked to pesticide overuse, epitomized by the "Cancer Express" phenomenon (Meek & Khadse, 2020).
The agroecological question reframes these challenges by emphasizing food sovereignty, ecological resilience, and equitable resource distribution (Altieri & Toledo, 2011). It raises critical inquiries:
1. Who controls seeds, their distribution, and application on land?
2. How does knowledge generation through ecological practices challenge corporate agribusiness and monoculture dominance?
3. What pressures do small farmers, indigenous communities, and vulnerable groups face due to the interplay of traditional, modern, and agroecological interventions?
These questions underscore the need for a paradigm shift toward farming practices that prioritize local circular economies, indigenous knowledge, and inclusive institutions over profit-driven models (Giraldo & Rosset, 2017).

Literature Review
The ecological perspective in Indian sociology remains underexplored, particularly in relation to agrarian change and environmental justice (Bag, 2023). While the Green Revolution increased food security, it also widened socio-economic disparities and environmental degradation (Pingali, 2012). Tyagi and Kumar (2020) argue for integrating scientific advancements with human-centered values to address Punjab's farming crisis, emphasizing the need to rethink lifestyles and agricultural priorities. Similarly, Meek and Khadse (2020) highlight how agroecological education fosters communal resilience, improving ecological and economic outcomes, though they caution against its potential co-optation by state and corporate actors.
Gliessman (2018) traces agroecology's evolution from a resistance to the Green Revolution's industrialization to a holistic food system approach that integrates science, practice, and social movements. However, Giraldo and Rosset (2017) warn that agroecology's growing popularity risks dilution, as institutional adoption may prioritize market interests over transformative potential. Jewitt and Baker (2007) provide a nuanced perspective, noting that villagers in North India credit the Green Revolution with economic benefits and reduced wealth gaps, though they lament subsidy cuts and infrastructure deficits as greater constraints than environmental degradation.
The agrarian crisis is further evidenced by farmer suicides, with NCRB data reporting a 165.88% increase in agricultural laborer suicides in Uttar Pradesh from 2017 to 2021 (NCRB, 2022). These figures, likely underreported due to stigma and administrative discrepancies, reflect deepening distress driven by rising input costs, debt, and limited income diversification (Deshpande & Prabhu, 2005). Women farmers and landless laborers face particular vulnerabilities, often misclassified as "housewives" despite their significant contributions to agriculture (Sims et al., 2021).

Findings and Discussion
Agrarian Distress and Environmental Injustice
The Green Revolution's legacy in Punjab reveals a paradox: while it achieved food surplus, it also entrenched ecological and social crises. Soil degradation, water pollution, and health issues, including rising cancer rates, are direct consequences of chemical-intensive farming (Kinkaid, 2019). Farmer suicides, driven by debt and crop failures, highlight the human cost of these practices, with NCRB (2022) reporting 11,290 suicides among farmers and laborers in 2022, constituting 6.6% of total suicides in India. The distress extends beyond farmers to daily wage laborers and women, whose contributions are often erased in official records (Sims et al., 2021).

Marginalization of Traditional Practices
Traditional farming practices, rooted in polyculture and local seed varieties, have been marginalized by the Green Revolution's emphasis on monoculture and hybrid seeds (Altieri, 1995). These practices, embedded in cultural rituals like Gobardhan Pooja and Bihu, fostered ecological resilience by maintaining soil fertility and biodiversity. However, market-driven agriculture, backed by corporate agribusiness, has prioritized profit over sustainability, concentrating wealth and knowledge among a few (Patel, 2009). The shift from decentralized, indigenous systems to industrialized models has disrupted the symbiotic relationship between agriculture and ecology, exacerbating environmental injustice (Perfecto et al., 2019).

Agroecology as a Transformative Alternative
Agroecology offers a counter-narrative to industrial agriculture, emphasizing ecological principles, food sovereignty, and social equity (Gliessman, 2018). By integrating diverse crops, agroforestry, and local knowledge, agroecological practices enhance resilience against climate variability and market fluctuations (Holt-Giménez et al., 2021). However, its scalability remains a challenge, as industrial farming benefits from institutional support, while agroecology struggles

against market-driven dispossession (Giraldo & Rosset, 2017). The case study of Rurka village illustrates this tension, where fertile lands are converted to urban use, displacing farmers and migrant laborers who rely on traditional practices for survival (Bardhan, 1984).

Case Study: Rurka Village

In Rurka, located on the rural-urban fringe of S.A.S. Nagar, Mohali, the brick kiln industry exemplifies agrarian flux. Migrant families, living in tin-roofed homes near the kilns, blend rural lifestyles with industrial labor. Their work, shaping bricks from fertile soil, mirrors agricultural labor, yet operates under industrial discipline. The proximity to paddy fields and the use of horses for transporting bricks highlight rural characteristics, while land acquisition for urban development threatens their livelihoods (Indian Express, 2023). These families' narratives reveal the intersection of ecological degradation, economic precarity, and cultural resilience, underscoring the need for agroecological interventions that preserve local practices and ensure equitable resource access.

Resistance and Resilience

Peasant resistance, as described by Scott (1985), manifests in subtle, everyday acts that challenge hegemonic agricultural systems without direct confrontation. In Punjab, farmers and laborers employ "weapons of the weak," such as diversifying crops or preserving traditional seeds, to resist market-driven monoculture (Mailleux Sant'Ana, 2007). Agroecology amplifies this resistance by fostering resilience through polyculture and local knowledge, countering the vulnerabilities imposed by industrial farming (Holt-Giménez et al., 2021). However, structural inequalities, including landlessness and gender disparities, limit the transformative potential of these practices, necessitating institutional reforms to support equitable access to resources (Gupta, 1998).

Conclusion

The concept of agrarian flux captures the dynamic and contradictory transformations reshaping agricultural landscapes in Punjab and beyond. The Green Revolution's legacy of productivity gains has come at the cost of ecological degradation, social inequities, and the marginalization of traditional practices. Agroecology offers a promising pathway to address these challenges by integrating ecological principles, food sovereignty, and social justice. However, its success depends on overcoming market-driven barriers and institutional biases that favor industrial agriculture. This study advocates for a pluralistic approach to agriculture that values local knowledge, supports circular economies, and prioritizes environmental justice. By addressing the agroecological question, policymakers, researchers, and communities can work toward sustainable food systems that ensure equitable access to resources, preserve biodiversity, and empower marginalized groups. Future research should explore the scalability of agroecological practices and their integration with global food systems to foster resilience and equity in agrarian landscapes.

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