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Review Article

Agricultural Inequality in Bhind District, Madhya Pradesh: Evidence from a Systematic Literature Review

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Abstract

Agricultural inequality remains a major challenge to inclusive rural development in India, affecting access to land, irrigation, institutional credit, technology, and markets, thereby influencing agricultural productivity and farmers' livelihoods. Despite extensive research at the national and state levels, district-level evidence remains limited, particularly for agriculturally vulnerable regions such as Bhind district in Madhya Pradesh. This study systematically reviews the literature to identify the key dimensions, determinants, and research gaps related to agricultural inequality in Madhya Pradesh, with a particular focus on Bhind district. Following the PRISMA 2020 guidelines, 552 records were identified through Scopus, Google Scholar, and institutional sources. After duplicate removal and eligibility screening, 75 studies published up to 2024 were included. Thematic analysis identified unequal land distribution, fragmented landholdings, inadequate irrigation, limited access to institutional credit, uneven technology adoption, weak market integration, and socio-economic disparities linked to caste and gender as the principal drivers of agricultural inequality. The review also highlights that existing research is largely concentrated at the national and state levels, with limited evidence on district-level disparities. Based on the synthesized findings, this study proposes a conceptual framework integrating the structural, institutional, and socio-economic dimensions of agricultural inequality in Bhind district. The findings emphasize the need for place-based policies that improve equitable access to productive resources, strengthen rural institutions, expand irrigation and market infrastructure, and support small and marginal farmers. The study provides a foundation for future empirical research and evidence-based agricultural policymaking in Madhya Pradesh and comparable agrarian regions.

Keywords

Agricultural Inequality, Systematic Literature Review, PRISMA, Land Ownership, Agricultural Productivity, Rural Development, Madhya Pradesh, Bhind District

1. Introduction

Agricultural inequality has emerged as a critical issue in the context of rural development and agrarian sustainability in India. Despite significant policy interventions aimed at enhancing agricultural productivity and farmers' welfare, disparities persist across regions, farm sizes, access to resources, and socio-economic groups [20, 25]. These inequalities are reflected in unequal ownership of land, differential access to irrigation, credit, technology, and markets, which

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together shape agricultural outcomes and rural livelihoods.

Madhya Pradesh, being one of the largest agrarian states in India, presents a complex agricultural structure marked by unequal distribution of land, irrigation facilities, agricultural inputs, and institutional support [39]. A high concentration of small and marginal farmers, low and uneven irrigation coverage, and significant regional variations in agricultural productivity characterize the state. Within the state, Bhind district characterized by semi-arid agro-climatic conditions, heavy dependence on monsoon rainfall, and the predominance of small and marginal holdings offers a representative yet underresearched setting to examine the dimensions and drivers of agricultural inequality [31].

The existing body of literature on agricultural development in India has extensively discussed issues such as land fragmentation, productivity differentials, input accessibility, and income disparities among farmers [9, 65, 74] Several studies highlight that unequal access to land and irrigation remains a central factor contributing to persistent agricultural inequality and rural poverty. However, district-specific analyses that integrate structural, institutional, and socio-economic aspects of agricultural inequality remain limited. A focused review of literature is therefore essential to contextualize the present study, identify conceptual and empirical gaps, and situate Bhind district within broader debates on agrarian inequality in Madhya Pradesh and India.

The primary purpose of this literature review is to critically examine existing theoretical and empirical studies related to agricultural inequality, with particular emphasis on land ownership, access to irrigation, agricultural inputs, credit availability, technology adoption, and income disparities among farmers [13, 32] The review seeks to synthesize national, state-level, and region-specific studies to understand the evolution, measurement, and determinants of agricultural inequality in India and Madhya Pradesh.

Further, the literature review aims to identify gaps in existing research, especially the lack of micro-level and district-specific analyses that capture local agrarian structures, institutional constraints, and socio-economic heterogeneity. By reviewing past studies, this section helps in refining the research questions, selecting appropriate indicators of agricultural inequality, and developing a conceptual framework for analyzing inequality in Bhind district. The review also provides a basis for comparing the findings of the present study with existing evidence and assessing its contribution to academic literature and policy discourse [24].

The scope of this literature review encompasses studies on agricultural inequality at multiple levels national, state, and regional with a particular focus on Madhya Pradesh. It includes research on land distribution, farm size disparities, access to irrigation and modern inputs, agricultural productivity, income inequality, and the role of institutional and policy interventions in shaping agrarian outcomes [19, 74]. Both classical and contemporary studies, drawing from economics, development studies, and agricultural policy literature, are reviewed to ensure a comprehensive understanding of the subject.

Structurally, the chapter is organized into several sections. Following the introduction, the literature review is presented thematically, covering theoretical perspectives on agricultural inequality, empirical evidence from India, and region-specific studies related to Madhya Pradesh. This is followed by a discussion on identified research gaps and the conceptual framework guiding the study. The final sections outline the research methodology, present empirical findings from Bhind district, and conclude with policy implications and recommendations aimed at reducing agricultural inequality and promoting inclusive agrarian development.

2. Methodology

This study is based on a systematic review of existing scholarly literature published in the form of journal articles, books, and policy reports. The review follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach to ensure a transparent and structured selection process [52, 55]. Relevant studies were identified using databases such as Scopus and Google Scholar through customized keyword searches related to agricultural inequality, land ownership, agrarian structure, and rural livelihoods. The review process included stages of identification, screening, and eligibility based on predefined inclusion and exclusion criteria. Only studies published in English till 2024, particularly in the fields of economics, social sciences, and agricultural studies, were considered. Both peer-reviewed and highly relevant institutional reports were included to ensure comprehensive coverage. The selected literature was then systematically organized and analyzed thematically to examine key dimensions such as land distribution, access to resources, productivity, and socio-economic inequalities. This approach helps in synthesizing existing knowledge, identifying research gaps, and providing a conceptual foundation for understanding agricultural inequality in India, with a specific focus on Madhya Pradesh and Bhind district.

2.1. Study Selection

The study selection process followed the PRISMA 2020 framework. A total of 552 records were identified through database searches and additional sources. After removing duplicate records, 321 studies remained for title and abstract screening. Following eligibility assessment, 75 full-text articles were included in the final review. The complete screening process is illustrated in Figure 1.

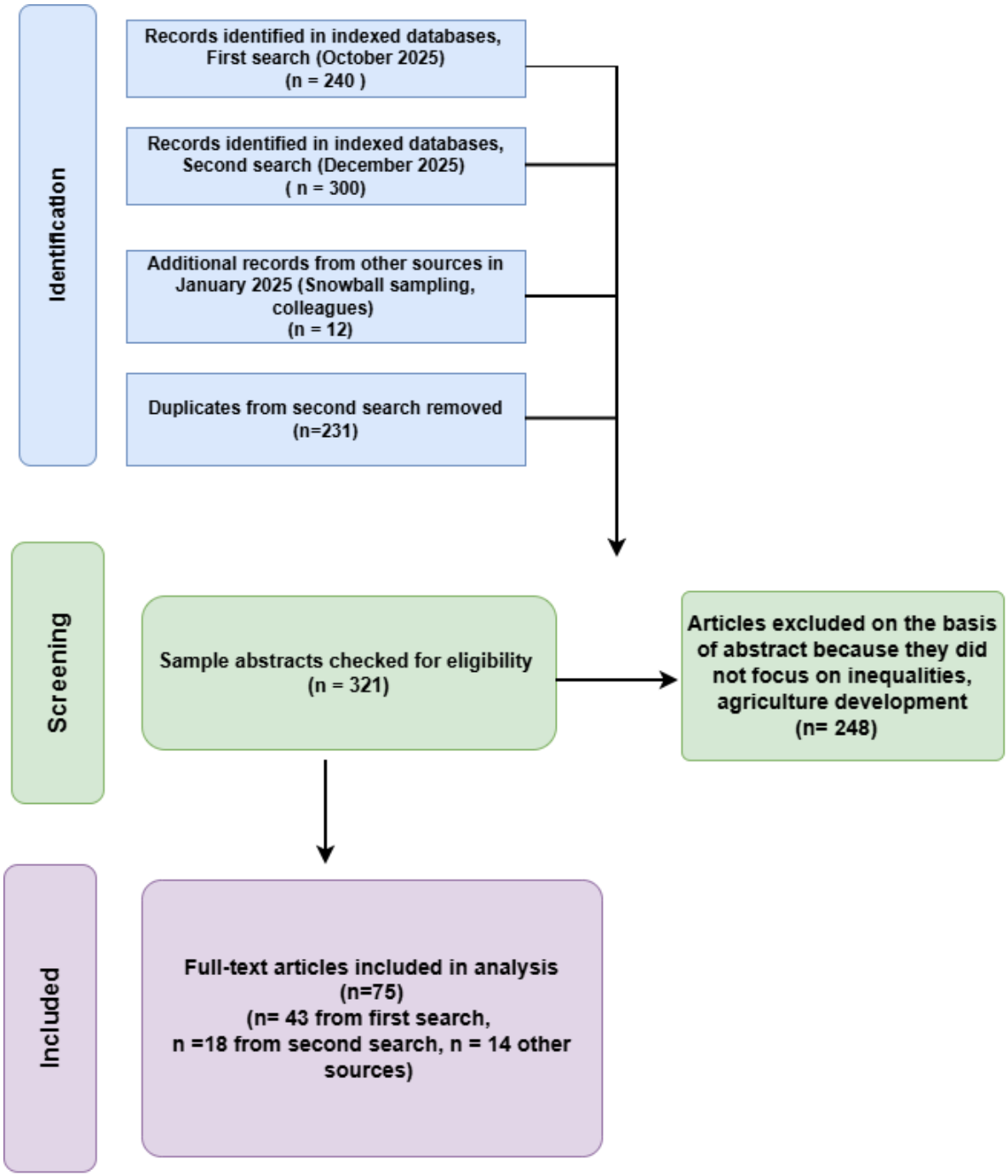


Figure 1. *PRISMA based methodology use for data collection.*

2.2. Data Extraction and Analysis

Information from the selected studies was extracted using a standardized data extraction sheet. The extracted information included author, publication year, study location, research objectives, methodology, key variables, and principal findings. The selected literature was analyzed using thematic analysis to identify recurring themes, including land ownership inequality, irrigation access, agricultural productivity, institutional credit, technology adoption, market access, and socio-economic disparities. The findings were synthesized to identify research trends, knowledge gaps, and implications for agricultural inequality in Madhya Pradesh, particularly Bhind district.

Table 1. Screening Results.

Article Title	Authors	Findings
Land Distribution and Inequality in Rural India	Rawal V. (2013)	Unequal land ownership remains the primary source of agricultural inequality, with marginal farmers controlling a disproportionately small share of agricultural land.
Farm Size Impacts on Efficiency, Productivity and Returns to Scale in Indian Agriculture	Birthal P. S., Jha A. K., Tiongco M., Narrod C. (2015)	Larger farms achieve higher productivity due to better access to irrigation, technology, and institutional support, while smallholders face structural disadvantages.
Credit Access, Rural Institutions and Agricultural Inequality in India	Jha S., Nagarajan H. K., Prasanna K. R. (2017)	Limited access to institutional credit forces small and marginal farmers to rely on informal lenders, reinforcing agricultural inequality.
Technology Adoption, Farm Size and Income Inequality in Indian Agriculture	Shankar B., Poole N., Rao E. J. O. (2019)	Adoption of modern agricultural technologies is positively associated with farm size, contributing to productivity and income disparities.
Regional Disparities in Agricultural Productivity in India	Pradhan K. C., Sahoo P., Nair R. (2020)	Significant differences in irrigation, infrastructure, and institutional support create wide regional disparities in agricultural productivity across Indian states.
Agricultural Regional Disparities: A Case of Madhya Pradesh	Dutta T., Rawat A., Singh J. (2020)	Madhya Pradesh exhibits considerable inter-district disparities in agricultural development, with districts such as Bhind facing low irrigation coverage and fragmented landholdings.
Understanding the Sources of Agricultural Growth in India	Birthal P. S., Negi D. S., Roy D. (2019)	Agricultural growth is driven by irrigation, technology adoption, and investment, but unequal access to these resources widens inequality among farmers.
Farm Size and Productivity: Understanding the Strengths of Smallholders and Improving Their Livelihoods	Chand R., Lakshmi Prasanna P. A., Singh A. (2011)	Smallholders can achieve high productivity but require improved access to markets, credit, technology, and institutional support.
Investment, Subsidies and Pro-Poor Growth in Rural India	Fan S., Gulati A., Thorat S. (2008)	Agricultural subsidies and public investments often benefit larger farmers disproportionately, limiting their effectiveness in reducing inequality.
Gender Inequality in Agriculture and Food Systems in India: Emerging Evidence	Mohanty S., Kumari V., Singh R. (2024)	Gender-based disparities in land ownership, credit access, and extension services continue to constrain women's agricultural productivity and income.

3. Results and Discussion

3.1. Conceptual Framework and Definitions of Inequality

Understanding agricultural inequality requires a clear conceptual grounding that integrates definitions of inequality, its multidimensional nature in agriculture, and relevant theoretical perspectives. This section outlines the key concepts and theoretical approaches that guide the analysis of agricultural inequality in Madhya Pradesh, with specific reference to Bhind district.

Inequality broadly refers to the uneven distribution of resources, opportunities, and outcomes among individuals or groups within a society [64, 73]. In the context of rural and agrarian economies, inequality is not limited to income differences but extends to access to and control over productive assets, institutions, and social opportunities [22].

Economic inequality refers to disparities in income, wealth, and productive assets. In agriculture, this is closely linked to differential land ownership, farm incomes, and access to capital. Empirical studies on rural India indicate that economic inequality is strongly associated with asset inequality, particularly land and livestock ownership, rather than wage income alone [46, 58].

Social inequality arises from historically rooted social stratification based on caste, class, gender, and ethnicity. In India, caste-based hierarchies continue to shape access to land, credit, education, and agricultural extension services. Marginalized groups such as Scheduled Castes and Scheduled Tribes remain disproportionately land-poor and face systemic exclusion from productive resources, reinforcing intergenerational inequality [27, 72].

Land-based inequality refers to the unequal distribution and control of landholdings. Land remains the most critical productive asset in agriculture, and its concentration among a small section of households leads to unequal production capacity, income generation, and political bargaining power. Despite land reforms, landlessness and marginal landholdings persist in many parts of Madhya Pradesh, reflecting structural constraints in agrarian transformation [10, 40, 41].

Resource-based inequality encompasses unequal access to irrigation, quality seeds, fertilizers, farm machinery, institutional credit, and market infrastructure. Even among farmers with similar land sizes, disparities in resource access lead to significant variations in productivity and livelihood outcomes [35, 44].

Together, these forms of inequality interact and reinforce each other, shaping agrarian structures and rural livelihoods.

3.2. Dimensions and Theoretical Approaches of Agricultural Inequality

Agricultural inequality is multidimensional and manifests across several interrelated dimensions:

Landholding inequality remains the most fundamental dimension. Literature based on Agricultural Census and NSS data consistently shows a highly skewed distribution of land, where a small proportion of households control a disproportionate share of cultivable land, while the majority operate marginal or small holdings [59]. In districts such as Bhind, land fragmentation and landlessness further exacerbate agrarian vulnerability.

Access to agricultural inputs, including irrigation, fertilizers, improved seeds, and farm machinery, varies significantly across farm sizes and social groups. Large and medium farmers are better positioned to adopt input-intensive agriculture, while small and marginal farmers largely depend on rain-fed cultivation and traditional practices, resulting in productivity gaps [14, 19].

Credit inequality refers to unequal access to institutional finance. Formal credit systems tend to favor farmers with clear land titles and collateral, while smallholders, tenant farmers, and sharecroppers rely heavily on informal sources at high interest rates. This credit constraint limits investment in productivity-enhancing technologies and increases vulnerability to agrarian distress [47, 62].

Technological inequality is reflected in the uneven adoption of mechanization, high-yielding varieties, and digital agriculture services. Technology adoption is closely linked to farm size, education, extension support, and access to capital, often excluding small and resource-poor farmers [69].

Market access inequality relates to differential access to output markets, storage facilities, price information, and procurement mechanisms. Farmers with better connectivity and scale advantages are able to secure higher prices, while small farmers often resort to distress sales due to weak bargaining power and limited storage capacity [18].

Overall, these dimensions determine agricultural productivity, income stability, and livelihood security, making agricultural inequality a structural and institutional issue rather than a purely economic one.

Several theoretical perspectives help explain the persistence and dynamics of agricultural inequality:

The Marxist approach views agricultural inequality as a consequence of class relations and ownership of the means of production. Unequal land ownership results in the exploitation of landless laborers and small peasants, leading to class differentiation within the peasantry. Capitalist penetration into agriculture intensifies inequality through commercialization, accumulation, and proletarianization of small farmers [56].

The Neoclassical approach emphasizes market mechanisms, factor endowments, and individual productivity. Inequality arises due to differences in skills, technology adoption, and efficient resource allocation. From this perspective, well-functioning markets for land, labor, and credit can potentially reduce inequality. However, critics argue that this approach overlooks structural barriers and initial asset inequalities faced by smallholders [33].

The Institutional economics approach highlights the role of formal and informal institutions such as land tenure systems, credit institutions, governance structures, and social norms in shaping agricultural outcomes. Institutional failures, including insecure land rights, exclusionary credit systems, and biased policy implementation, are central to the persistence of agricultural inequality [5, 54].

In addition, political economy perspectives emphasize power relations, historical land relations, and state policy biases. Public investments in irrigation, subsidies, and procurement often disproportionately benefit larger farmers, reinforcing existing agrarian inequalities [16, 71].

3.3. Conceptual Linkage for the Study

Drawing from these perspectives, the present study conceptualizes agricultural inequality as a multidimensional phenomenon shaped by land distribution, access to productive resources, institutional arrangements, and socio-economic characteristics. Unequal access to land, inputs, credit, technology, and markets leads to differential productivity and income outcomes, which in turn reinforce rural inequality in Bhind district.

3.4. Global and National Perspectives on Agricultural Inequality

3.4.1. Key Global Trends and Comparative Studies

Agricultural inequality has emerged as a critical issue in global development discourse, particularly in the context of rising disparities in land ownership, access to productive resources, and returns to agricultural labor. Globally, inequality in agriculture is shaped by structural differences in farm sizes,

technological adoption, market access, and policy environments.

Several international studies highlight that land distribution remains highly skewed, especially in regions of Africa, Latin America, and South Asia. For instance, research by FAO and World Bank shows that smallholders defined as farms under 2 hectares, produce a significant proportion of global food yet hold a disproportionately small share of agricultural assets and income streams [36, 75]. These disparities are further compounded by gender gaps; women frequently have limited access to land and credit, which constrains productivity and economic outcomes [30].

Comparative cross-country studies also reveal that countries with concentrated landholding patterns tend to exhibit higher rural poverty rates and lower agricultural growth. For example, in Brazil and South Africa, high land inequality has been linked with slower diffusion of modern inputs and stagnation in agricultural productivity [2, 15]. Conversely, East Asian nations like Japan and South Korea achieved early reductions in land inequality through land reform policies in the mid-20th century, subsequently accelerating rural income growth and productivity [45].

These global perspectives underscore that agricultural inequality is multifaceted, involving not just land distribution but also access to infrastructure, credit markets, technology, and extension services.

3.4.2. Major Findings from Indian Contexts

In India, agricultural inequality has attracted significant scholarly attention due to its implications for rural livelihoods, poverty reduction, and agricultural sustainability. Since the Green Revolution, Indian agriculture has witnessed substantial growth in aggregate production; however, the benefits of this growth have not been equitably distributed.

Empirical studies highlight persistent landholding fragmentation as a central driver of inequality. According to NSS (National Sample Survey) data and agricultural censuses, the proportion of marginal and small farmers (holding <2 hectares) has steadily increased. In contrast, the number of operational holdings has grown mostly through subdivision rather than new investment (GOI, Agricultural Census, various rounds). This fragmentation has constrained economies of scale and hindered productivity growth among smallholders [43, 49].

Beyond land, inequality manifests in access to irrigation, quality inputs, credit, and markets. Studies using panel and household survey data show that large farmers are more likely to adopt high-yielding varieties, mechanization, and irrigation technologies, resulting in higher incomes than smallholders [13, 66]. Research on rural credit markets indicates that marginalized farmers often rely on informal credit sources with higher costs, exacerbating income disparities [47].

Moreover, regional differences are significant. States like Punjab and Haryana, which benefited early from irrigation and agricultural policy support, exhibit different inequality patterns compared to states such as Bihar or Odisha, where infrastructural constraints and market failures persist [61]. Meanwhile, socioeconomic factors such as caste and gender also intersect with agricultural inequality; Dalit, tribal, and women farmers tend to have lower asset ownership and access to productivity-enhancing services [70].

3.4.3. Inequality in Agricultural Productivity and Income Across Indian States

State-level analysis reveals marked heterogeneity in agricultural productivity and income distribution across India. Using data from sources such as the Ministry of Agriculture, State Economic Surveys, and NSS household modules, researchers have documented that spatial inequality in agricultural outcomes reflects differences in agro-climatic endowments, institutional capacities, and historical policy priorities.

For instance, productivity levels in states like Punjab, Haryana, and Gujarat consistently exceed the national average due to better irrigation infrastructure and input use, whereas Bihar, Jharkhand, and Madhya Pradesh lag behind in crop yields and value chains [57]. This productivity gap translates into income disparities, where farmers in high-productivity states earn significantly more per hectare and per worker compared to those in lagging states.

Multiple studies employing decomposition techniques (e.g., Gini indexes, Theil decomposition) confirm that within-state inequality contributes substantially to overall agricultural income inequality in India. Factors such as unequal access to markets, credit, and land ownership explain much of this within-state variation [7, 21].

Importantly, the role of policy interventions such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), public procurement systems, and subsidy programs has been examined for their impact in mitigating or reinforcing inequality. Evidence suggests mixed effects: while wage employment schemes have provided income support in poorer states, they have not fundamentally transformed structural inequalities in agricultural asset ownership or productivity [63].

3.4.4. Historical Context of Agricultural Inequality in India

Agricultural inequality in India has deep historical roots shaped by colonial land relations, post-independence land reforms, technological change, and state-led policy interventions. These structural factors have influenced unequal access to land, technology, inputs, and state support, with long-term implications for agrarian livelihoods, particularly in states such as Madhya Pradesh and districts like Bhind where agriculture remains the primary source of income.

3.5. Historical Evolution and Policy Interventions

Land reforms introduced after independence were aimed at

dismantling the feudal agrarian structure inherited from the colonial period, characterized by zamindari, jagirdari, and intermediary systems. The abolition of intermediaries, imposition of land ceiling laws, and tenancy reforms were expected to promote equity by redistributing land to landless and marginal farmers [3, 6]. While these reforms led to some improvement in ownership security and tenancy rights, their overall impact on reducing agricultural inequality has been uneven and limited.

Empirical studies suggest that land reforms were implemented more effectively in some regions than others, largely due to differences in political will, administrative capacity, and local power structures [4]. In many states, including Madhya Pradesh, land ceiling laws suffered from loopholes, benami transfers, and poor enforcement, allowing large landholders to retain control over land [23]. As a result, land ownership continues to be highly skewed, with marginal and small farmers dominating in numbers but controlling a disproportionately small share of agricultural land.

In districts like Bhind, historical patterns of land concentration, caste-based ownership, and inheritance practices have further reinforced inequality. Fragmentation of holdings over generations has reduced operational efficiency for small farmers, while large landholders continue to enjoy better access to credit, irrigation, and markets. Thus, despite decades of land reform efforts, land remains a critical source of agricultural inequality in rural India.

The Green Revolution of the late 1960s and 1970s marked a turning point in Indian agriculture by introducing high-yielding varieties (HYVs), chemical fertilizers, pesticides, and assured irrigation. While it significantly increased food grain production and helped India achieve food self-sufficiency, its distributional impacts were highly uneven [37, 42].

The benefits of the Green Revolution were largely concentrated in regions with pre-existing irrigation infrastructure, favorable agro-climatic conditions, and better access to institutional credit, such as Punjab, Haryana, and western Uttar Pradesh. Rain-fed regions, including large parts of Madhya Pradesh, experienced limited gains, thereby widening inter-regional agricultural inequality [38]. Within states, large and medium farmers were better positioned to adopt capital-intensive technologies, while small and marginal farmers faced constraints due to lack of resources and risk-bearing capacity.

Studies have shown that the Green Revolution reinforced class differentiation in rural areas by increasing returns to land and capital, often at the expense of agricultural laborers and smallholders [17]. In districts like Bhind, where irrigation coverage expanded unevenly and dependence on monsoon rainfall remains significant, the technological divide further accentuated disparities in productivity and income. Consequently, the Green Revolution contributed not only to regional disparities but also to intra-district inequality in agricultural outcomes.

Since the 1980s, agricultural policy in India has relied heavily on subsidies and support mechanisms, including fertilizer and power subsidies, minimum support prices (MSP), irrigation investments, and crop insurance schemes. While these interventions aim to stabilize farm incomes and ensure food security, the literature indicates that their benefits are unevenly distributed across farm sizes and regions [34, 43].

Large and irrigated farmers tend to capture a disproportionate share of input subsidies due to higher input use, better access to information, and stronger political influence. For instance, fertilizer and electricity subsidies primarily benefit farmers with larger landholdings and access to irrigation, marginalizing rain-fed and small farmers [1]. Similarly, MSP procurement operations are concentrated in a few crops and states, offering limited benefits to farmers in Madhya Pradesh, particularly in districts like Bhind where procurement infrastructure and crop diversification are constrained.

Recent policy initiatives such as direct income support (e.g., PM-KISAN) and crop insurance schemes have attempted to address equity concerns; however, studies highlight issues related to exclusion errors, delayed payments, and unequal access among tenant farmers and landless cultivators [29]. As a result, policy interventions have often reinforced existing agricultural inequalities rather than alleviating them.

Overall, the historical evolution of land relations, technological change, and state policies has created a layered structure of agricultural inequality in India. Understanding this historical context is essential for analyzing contemporary agrarian disparities in Madhya Pradesh and Bhind district, and for designing inclusive agricultural policies that address structural inequities.

3.6. Relevance of Existing Literature to Madhya Pradesh and Bhind District

While global and national studies provide critical insights into the nature, determinants, and consequences of agricultural inequality, their implications are particularly relevant for agrarian states such as Madhya Pradesh, where agriculture continues to be the primary source of livelihood for a substantial proportion of the population. The global literature emphasizes structural drivers of agricultural inequality, including unequal land distribution, differential access to technology, irrigation, credit, and institutional support [36, 75]. These factors closely resonate with the agrarian structure of Madhya Pradesh, which is characterized by a dominance of small and marginal farmers, fragmented landholdings, limited irrigation coverage, and heavy dependence on monsoon rainfall.

Studies from the Indian context documenting increasing land fragmentation, declining average farm size, and unequal access to productive resources [43, 50] are directly applicable to Madhya Pradesh. Evidence from the Agricultural Census consistently shows that a large majority of operational holdings in the state fall under the marginal and small categories. This structural constraint limits the adoption of mechanization, modern inputs, and advanced farming practices, reinforcing productivity and income disparities. These findings align with

national-level studies that demonstrate lower productivity, higher vulnerability, and reduced farm incomes among smallholders compared to medium and large farmers [11, 66].

Regional inequality literature further highlights that Madhya Pradesh lags behind agriculturally advanced states such as Punjab, Haryana, and Gujarat in terms of irrigation intensity, crop diversification, mechanization, and value-chain integration [57]. Such inter-state disparities reflect historical policy biases favoring irrigated and high-input regions, which have contributed to persistent regional inequalities in agricultural growth and farm incomes. These broader patterns are mirrored within Madhya Pradesh itself, where significant inter-district disparities exist in land quality, irrigation infrastructure, access to institutional credit, and market connectivity.

Within the state, districts in western and central Madhya Pradesh generally perform better in terms of irrigation coverage and agricultural productivity, whereas districts in northern and eastern regions including Bhind are characterized by a higher concentration of marginal landholdings, lower irrigation intensity, and limited access to agricultural services. This spatial inequality reinforces uneven agrarian development and contributes to divergent income trajectories across districts.

The relevance of caste and social stratification, widely emphasized in Indian agricultural literature [61, 70], is particularly pronounced in districts like Bhind, where a substantial share of cultivators belongs to socially and economically disadvantaged groups. The intersection of small and fragmented landholdings, caste-based disadvantages, and restricted access to extension services and institutional support may intensify agricultural inequality at the district level. However, these interlocking dimensions of inequality remain inadequately examined in existing empirical studies.

Studies examining rural credit markets and agrarian income inequality [47] also offer important insights for understanding agricultural inequality in Bhind district. The relatively high dependence on informal sources of credit in such districts reinforces income disparities between farmers who can access institutional finance and those reliant on moneylenders. Similarly, national evidence on the mixed impact of policy interventions such as MGNREGA, input subsidies, and price support mechanisms [63] suggests that while these schemes may provide short-term income relief in Madhya Pradesh, they have limited effectiveness in addressing deep-rooted structural inequalities related to land ownership, productivity, and access to resources.

Despite the existence of a rich body of global, national, and state-level research, a significant gap remains in district-specific empirical studies that systematically analyze agricultural inequality in Madhya Pradesh. Most existing analyses rely on aggregated state or regional data, thereby obscuring local-level variations in land distribution, productivity, and income. As a result, there is limited understanding of how broader drivers of agricultural inequality operate at the micro level within specific districts such as Bhind.

In this context, the present study seeks to bridge this gap by providing a district-level analysis of agricultural inequality in Bhind, drawing upon household- and district-level data to examine disparities in land ownership, agricultural productivity, and income distribution. By situating Bhind district within the broader global, national, and regional literature, the study contributes to a more nuanced understanding of agricultural inequality and generates policy-relevant insights tailored to the specific agrarian conditions of Madhya Pradesh.

3.7. Factors Contributing to Agricultural Inequality in India, Madhya Pradesh and at the District Level

Agricultural inequality in India is a complex multi-dimensional phenomenon shaped by structural, institutional, and socio-cultural factors that interact to produce differential access to resources, technology, markets, and economic opportunities among agricultural households. Emerging scholarship emphasizes that inequalities in land ownership, access to irrigation and modern agricultural technologies, availability of institutional credit, integration into agricultural markets, and entrenched social hierarchies associated with caste, class, and gender play significant roles in perpetuating agricultural disparities at national, state, and sub-state levels [46, 51]. These factors not only determine households' productive capacity but also influence their livelihood security, adaptive capabilities to shocks, and socio-economic mobility over time.

3.7.1. Land Ownership Patterns

Land ownership remains the most enduring and profound determinant of agricultural inequality in India. A significant body of agrarian research has shown that skewed land distribution characterized by a concentration of land among a small proportion of large farmers and widespread fragmentation among smallholders creates entrenched disparities in agricultural productivity and income [8, 53]. Inequitable landholding structures limit the capacity of marginal and small farmers to achieve economies of scale, access formal credit, and adopt improved inputs or mechanization.

In Madhya Pradesh, the pattern of land distribution mirrors national trends but with distinct regional variations. Studies indicate that while the proportion of marginal and small farmers dominates the agrarian structure in districts like Bhind, the share of operational holdings in medium and large categories remains limited [20]. This persistent inequality in land ownership constrains the accumulation of productive assets and reinforces rural poverty. Moreover, land fragmentation in MP exacerbates production inefficiencies and reduces the bargaining power of smallholders in both input and output markets.

3.7.2. Access to Irrigation and Technology

Access to irrigation and modern agricultural technology is

another critical factor influencing agricultural inequality. Research across Indian states documents that unequal distribution of irrigation facilities exacerbates disparities in crop yields, cropping intensity, and farm incomes [28]. Farmers with assured irrigation are more likely to diversify into high-value crops, adopt mechanization, and invest in productivity-enhancing innovations compared to rainfed farmers who face unpredictable climatic risk.

In Madhya Pradesh, disparities in irrigation infrastructure are pronounced. Western and central districts with better canal systems and groundwater access exhibit higher agricultural productivity than eastern districts like Bhind, where irrigation penetration remains limited [47]. The lack of reliable water sources not only depresses yields but also discourages investment in high-value technologies, reinforcing an unequal trajectory of agricultural development. Additionally, differential access to mechanized tools and digital technologies further widens the productivity gap between resource-rich and resource-poor farmers.

3.7.3. Credit Availability and Institutional Support

Access to agricultural credit and institutional support mechanisms plays a pivotal role in determining smallholder capabilities to sustain and expand productive activities. Formal credit from banks and cooperatives enables farmers to invest in seeds, fertilizers, machinery, and irrigation, whereas reliance on informal credit often leads to indebtedness and distress [60]. National-level studies indicate that institutional credit distribution remains skewed toward larger farmers who possess collateral and stronger financial linkages, while marginal farmers are frequently excluded or limited to high-cost informal lenders.

In Madhya Pradesh, despite progressive expansion of rural credit, disparities persist in credit outreach. District-level analyses illustrate that districts with stronger cooperative networks and regional rural banks exhibit better credit penetration [68]. However, in Bhind and similar agrarian districts, institutional credit remains constrained, resulting in higher vulnerability to exploitative informal lending and reduced investment in productivity-enhancing inputs. The limited reach of agricultural extension services further compounds these constraints, as smallholders often lack timely information on credit products or technical support.

3.7.4. Market Access and Price Realization

Market integration and price realization are fundamental in shaping the economic returns of agricultural production. Unequal access to markets both in terms of physical proximity to mandis (agricultural markets) and capacity to engage in supply chains creates significant disparities in farmers' ability to secure remunerative prices for their produce [12]. Transportation costs, market intermediaries, and information asymmetries often depress farm-gate prices for small and remote producers.

At the state level, studies highlight that districts with better connectivity to major marketplaces and processing hubs capture higher price premiums and achieve greater commercialization of agriculture [67]. Conversely, districts with poor transport infrastructure and limited aggregation facilities face chronic price disadvantage. In Bhind, the combination of remote market access, dependence on primary commodity markets, and lack of value-addition infrastructure contributes to lower price realization, constraining farmers' income potential and reinforcing inequality.

3.7.5. Caste, Class, and Gender Dynamics in Agricultural Labor

Socio-cultural hierarchies of caste, class, and gender profoundly influence access to productive resources, wage opportunities, and decision-making authority in rural India. Agrarian studies have consistently documented that marginalized caste groups (Scheduled Castes and Scheduled Tribes) and women are disproportionately represented among landless agricultural laborers and smallholders with limited asset ownership [26, 48]. These structural inequalities are reflected in differentiated access to land, credit, extension services, and remunerative employment.

In Madhya Pradesh, caste-based stratification intersects with economic inequality, as SC/ST households are more likely to possess smaller landholdings and limited access to productive resources and infrastructural support compared to upper-caste counterparts [26, 28]. Gender dynamics further compound inequality, with women farmers often excluded from formal credit, training programs, and decision-making processes within households and cooperatives. At the district level, Bhind exhibits similar patterns of socio-economic marginalization, where caste and gendered divisions in labor and resource access reinforce differentiated agricultural outcomes and limited upward mobility for disadvantaged groups.

4. Conclusion

Agricultural inequality is still one of the biggest issues in ensuring an inclusive and sustainable rural development in India. It is shown in this review that agricultural inequality includes not only income and productivity inequality but also inequalities in the distribution of land, irrigation, institutional credits, modern technology, market access, and other resources. These aspects are interlinked and support each other, which leads to the perpetuation of disadvantages for small and marginal farmers, women, and socially disadvantaged groups.

It is demonstrated in the reviewed literature that various historical reasons, such as the structure of land tenures during the period of colonization, regional differences in the process of implementing land reforms, and inequalities resulting from the Green Revolution, have formed the present situation in the field of agricultural inequality. However, despite numerous government programs that have increased agricultural output and improved well-being of farmers, the benefits from these

programs have not been equal among different areas and social classes.

Indeed, the literature further emphasizes the fact that Madhya Pradesh exemplifies a majority of the structural problems that exist at the national level. Fragmentation of landholdings, uneven development of irrigation facilities, and lack of institutional credit, poor market facilities, and socio-economic disparity lead to differences in agricultural efficiency. Such problems are especially evident in the case of Bhind district, where reliance on rain-fed agriculture, fragmented land ownership, and lack of productive inputs hinder agricultural development.

Moreover, the literature further reveals several gaps in the existing body of literature in this area. In most cases, researchers have carried out national or state-level studies but have neglected to carry out district-level studies. Additionally, there is a lack of consideration of the socio-economic, institutional, and geographic variables in assessing the agricultural inequality. For future research, it would be appropriate to take a multi-dimensional approach by collecting data from a household or district-level perspective.

Overall, addressing agricultural inequality calls for a holistic policy framework that facilitates equality in the availability of land, water resources, institutional credit, technology, extension, and marketing. Enhancing rural infrastructure, better governance, and intervention measures tailored to small farmers, women, and the underprivileged groups would play an important role in ensuring inclusive growth of agriculture. The conclusions drawn from this review would provide a robust basis for future district-level studies on agricultural inequality in Bhind and the larger issue of agricultural development in India.

Abbreviations

FAO	Food and Agriculture Organization
GOI	Government of India
HYV	High-Yielding Varieties
MGN	Mahatma Gandhi National Rural Employment
REGA	Guarantee Act
MSP	Minimum Support Price
NSS	National Sample Survey
PRIS	Preferred Reporting Items for Systematic
MA	Reviews and Meta-Analyses
RBI	Reserve Bank of India
UNDP	United Nations Development Programme

Author Contributions

Ankit Singh: Conceptualization, Data curation, Methodology, Resources, Validation, Writing – original draft

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Conflicts of Interest

The authors declare no conflicts of interest.

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