frontiers | Frontiers in Sustainability

TYPE Review
PUBLISHED 15 January 2025
DOI 10.3389/frsus.2024.1492456

OPEN ACCESS

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RECEIVED 06 September 2024
ACCEPTED 27 December 2024
PUBLISHED 15 January 2025

CITATION
Chaudhary D, Tiwari R, Taneja S, Johri A, Uddin M and Shamsuddin Z (2025) Factors influencing market value of agricultural land and fair compensation.
Front. Sustain. 5:1492456.
doi: 10.3389/frsus.2024.1492456

Factors influencing market value of agricultural land and fair compensation

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The current research focuses on reviewing the relevant factors responsible for developing a farming community in India. A significant segment of the Indian population depends upon agriculture. For the development of the economy, there must be proper formulation and execution of relevant policies. A review of related studies was conducted to find the dominant variables responsible for developing farming communities and providing sustainable livelihood to farmers. The review brings out some significant variables, and the importance of those variables is justified by the network analysis of how the keywords are used in research. The collective approach of reviewing related studies and keyword analysis helped frame a framework for achieving sustainable livelihood amongst agriculturalists. The current study constructs valuable discernment associated with the facets that need to be concentrated on in ripening the farming sector of the Indian economy. Moreover, the current examination requires an empirical investigation of the variables accentuated in the present contemplation based on a review steered.

KEYWORDS

farmland, characteristics, location, amenities, market value, age, household income, education

1 Introduction

Farmers hold immense economic and social significance to the Indian economy as they are the backbone of the agricultural sector (Mejia MA et al., 2022; Sruthy Madhavan, 2017; Terlau et al., 2019), contributing significantly to GDP (Narayanan, 2015; Shankar and Maraty, 2009), employment (Mahendra Dev, 2017), and food security (Ahmad et al., 2011); their role in rural development (Francis, 2015) and poverty alleviation is crucial (Swanson, 2006), as agriculture supports over half of the Indian population, promotes rural industrialization (Agarwal, 1983), sustains agro-based industries (Paramasivan and Pasupathi, 2023), and ensures social stability by maintaining traditional agrarian lifestyles and fostering community resilience against urban migration and socio-economic disparities (Wilson et al., 2018). With a paradigm shift in our economic policy toward liberalization and privatization since the early 1990s, the government is handing over more land-related projects, leading to Land Acquisition (LA).

Land Acquisition (LA) refers to the legal and administrative procedures by which a government or other authorized entity acquires land from private individuals or other entities for industrialization and urbanization (Purohit et al., 2023); although it is a necessity for infrastructure development, urban expansion, and industrial projects (Gemeda et al., 2023). According to a report by United Nations (2022), by 2050 two-thirds of the world's population are projected to live in cities. Low and lower-middle-income nations, notably those in Asia and Africa, are likely to have the fastest rates of urbanization. While these initiatives are often

seen as essential for economic growth, they have also raised concerns about the displacement of local communities, loss of agricultural land, and environmental impacts. Balancing development needs with social equity and sustainability has thus become a critical challenge in the ongoing process of land acquisition. Farmers often face numerous challenges due to land acquisition, primarily involving the loss of their livelihoods and land, displacement from ancestral land, loss of income and food, they struggle with inadequate compensation (Tuan, 2021). Inadequate compensation can also lead to social and economic instability, as displaced farmers struggle to maintain their previous standards of living, and are not satisfied (Reddy, 2018). It is needed to systematically measure, prioritize, and address agrarian distress in India's drylands, integrating diverse dimensions like risk exposure, adaptive capacity, and socio-psychological impacts to guide actionable interventions (Reddy et al., 2021). The lack of adequate financial support can hinder their ability to invest in new agricultural practices, access resources, or secure housing in a new location.

Here, valid market valuation of agricultural land is paramount in accomplishing fair remuneration for displaced farmers, assuring they obtain a suitable ROI that reflects the real value of their farmland, thereby strengthening their economic resilience and providing sustainability (Sarkar, 2014). The Indian government has designated explicit laws for land compensation, including the: (a) Right to Fair Compensation, (b) Transparency in Land Acquisition, Rehabilitation, and Resettlement Act. These rules and regulations strive to deliver just compensation, rehabilitation, and resettlement for affected farmers (Cernea, 2008).

For displaced farmers, farmland valuation is very crucial as it provides a sense of security in the form of economic support (de Schutter, 2011). Similarly, fair compensation is one of the significant parameters providing economic strength to the displaced or land-less farmers (Nyongesa et al., 2016). Figure 1 shows the significance of compensation for displaced farmers. However, the effectiveness of the compensations often varies, as discrepancies in land valuation and compensation can lead to dissatisfaction, social unrest, and legal disputes.

The whole procedure of demarcating market value (Brinkley, 2012), nourishing fair compensation (Venteris et al., 2012), and clinging to government regulations (Li et al., 2023) is innately connected to sustainable development (Manna et al., 2021), as it encourages financial resilience (Szálteleki et al., 2024), social equity, moreover, the sustainability of agrarian conventions amidst steady industrialization and urbanization (Thornton, 2018; Zoomers et al., 2017). The shift away from agrarian land for industrial or urban purposes disrupts conventional farming methods which can jeopardize the long-term viability of agricultural communities (McCown, 2002), necessitating rightful remuneration and sustainable evolution approaches (Robèrt et al., 2002).

Resettlement and Rehabilitation for sustainable livelihood plays a significant role in improving the strength of the land-displaced farmers for facing upcoming uncertainties related to different aspects of the farming business (Azumah et al., 2023). Also, if the farmer is economically sound and has a sustainable income food, he will be in the position doing farming in such a way that it promotes SDGs. Considering the present condition of Indian farmers poverty is one of the major issues which can be addressed by making a system ensuring sustainable livelihood for the farmers (Naika et al., 2020). Moreover, this situation will further solve the issue of food security as the farmer will be in the economic condition of affording organic fertilizers and pesticides resulting in making crops, fruits, and vegetables more nutritious and safe (Schoonhoven-Speijer and Ruben, 2015). The objective of sustainable livelihood of the farmers will also solve the problem of rural migration which can act as a curse for the farming business of the Indian economy long run. Sustainable livelihood is significant for ensuring relevant disbursement of educational facilities, healthcare facilities, and other aspects related to human well-being to

FIGURE 1
Significance of fair compensation for land-displaced farmers.

the biggest employment sector of the Indian economy (He and Li, 2024). By bringing economic stability in the lives of displaced farmers with the help of the integration of a sustainable livelihood system, farmers will be in the position of increasing returns group farming which will further help in the acquisition of more fertile land for the expansion of their businesses (Sun et al., 2023). This will build generational equality and bring empowerment to the lives of displaced farmers.

Farmers' Sustainable livelihood has become a cause of concern due to the acquisition of agricultural land for industrialization and urbanization, therefore, it is important to determine the most appropriate means of compensation to safeguard their livelihoods. A well-designed R&R policy not only restores their livelihoods but also promotes the United Nations' Sustainable Development Goals (SDGs), such as ending poverty (SDG 1), ensuring zero hunger (SDG 2), and promoting responsible consumption and production (SDG 12). Additionally, it is necessary to uncover the primary factors that determine the market value of farmland and how the demographic characteristics of farmers influence their compensation and livelihood outcomes. As it is essential for developing policies that ensure fair compensation, promote economic stability, and support sustainable agricultural practices (Kassie et al., 2017). Thus, the research was structured to address the following research questions:

- RQ1. What are the primary factors that determine the market value of farmland?
- RQ2. How do demographic characteristics of farmers influence their compensation and livelihood outcomes?
- RQ3. What role does fair compensation play in achieving sustainable livelihoods for farming communities?

The research questions aim to improve farmers' conditions. To answer these questions, initially a literature search on the Scopus database was done. Relevant research is cited from the entire dataset to find relationships between the pertinent variables. The answer to the research questions is analyzed through a systematic review of the literature to identify and analyse factors influencing the market value of farmland, utilizing multiple sources to substantiate the hypothesized influences and through relevant statistics considered by the Indian government. Also, keyword analysis in the form of a bibliometric review was conducted to measure the weightage of the variables identified.

2 Literature review

2.1 Market value of farmland

The valuation of agricultural land represents a critical intersection of economic, environmental, and social factors in the modern agricultural sector. The Food and Agriculture Organization (FAO, 2022) identifies multiple key determinants affecting farmland values: soil quality, water availability, climate conditions, location relative to markets, and infrastructure access. Based on such characteristics, an increase or decrease in the market value can be predicted (Bridhikitti et al., 2023). Roy et al. (2017) demonstrate that urban proximity and development potential can significantly inflate agricultural land prices, often exceeding values justified by agricultural returns alone.

Research indicates that land located closer to marketplaces tends to have higher prices compared to areas farther away (Mansaray et al., 2019). Therefore, if an agricultural investor aims to benefit from potential land value appreciation, it is advisable to invest in farmland situated near areas where agricultural products are consumed or processed (Arslan et al., 2017).

2.1.1 Farmland amenities

Researches supporting the factors influencing the market value of farmland has shown that farmland amenities also play a significant role in controlling the market value of agricultural premises (Chaudhary et al., 2020; Zasada, 2011). Farmland amenities encompass various features and services such as irrigation systems, drainage, roads, storage facilities, fencing, shelterbelts, water sources, equipment sheds, livestock facilities, access to markets, utilities, and soil conservation measures, all of which enhance the productivity, sustainability, and operational efficiency of agricultural land (Bergstrom and Ready, 2009; Libby and Irwin, 2003). Considering such amenities on the farm property will effectively help preserve the market value of farmland (Johnston et al., 2001).

2.1.2 Farmland location

The location of farmland is a paramount determinant in its market value, encompassing multiple geographic and economic dimensions. According to spatial economic theory, the proximity of farmland to urban centers significantly influences its value due to potential development opportunities and access to markets (Livanis et al., 2016). Research by (Henderson et al., 2021) indicates that parcels located within 50 miles of metropolitan areas command price premiums of 15–40% compared to similar lands in remote areas. Transportation infrastructure access, including proximity to highways and processing facilities, creates value differentials due to reduced logistics costs and increased market accessibility (Zhang et al., 2020).

2.1.3 Farmland characteristics

Physical and agronomic attributes of farmland constitute fundamental value determinants. Soil quality, measured through parameters such as organic matter content, drainage capacity, and fertility, directly correlates with productive potential and thus market value (Dongmo, 2021; Thompson et al., 2018). Water resources, including rainfall patterns, irrigation infrastructure, and water rights, significantly impact land values, particularly in arid regions where water scarcity is a growing concern (Martinez et al., 2021). Topographical features, such as slope and elevation, affect mechanization potential and erosion risk, thereby influencing valuation (Anderson and Smith, 2017).

2.2 Farmer's demographics

Research indicates that farmer age, education level, and succession planning significantly influence land acquisition and disposition decisions (Brown et al., 2020). According to the USDA's Agricultural Resource Management Survey, the aging farmer population (average age 57.5 years) has created distinct market pressures, with retirement-driven sales affecting regional land availability and prices. Education levels correlate with adoption of technological innovations and sustainable practices, which can enhance land value through improved

management (Wilson et al., 2019). Female farmers, representing a growing segment of farm operators, often face unique challenges in land acquisition and financing, impacting local market dynamics (Garcia et al., 2022).

2.3 Fair compensation

The market worth of farmland, which significantly coaxes fair compensation to farmers, is determined by factors such as soil quality, water availability, location, land size, current land use, potential for future development, local agricultural economy, government policies, and market demand (Krishna et al., 2013). This ensures that farmers receive an equitable price, contemplating the land's agrarian productivity and investment prospects. Fair compensation refers to the appropriateness of money received by agricultural workers against their work on the farms. Fair compensation to farm workers has been a challenging policy implementation segment for the Indian government. The problem of fair compensation for Indian farmers is deeply rooted in issues like fragmented land holdings, inadequate market infrastructure, fluctuating crop prices, lack of access to credit, limited bargaining power, delayed payments, intermediaries' exploitation, and insufficient government support, leading to financial instability and distress among the farming community. If the government desires agriculturalists to attain sustainable livelihood, it must enforce policies ensuring fair compensation to farmers.

2.4 Sustainable livelihood

Sustainable livelihood refers to the situation where farmers are in the condition of maintaining a reasonable standard of living constantly without compromising the resources they own. A sustainable livelihood for farming communities is one that not only ensures long-term financial stability and resilience against economic shocks but also promotes environmental conservation by adopting sustainable farming practices, enhances social well-being by improving access to education, healthcare, and nutritious food, supports community cohesion and reduces rural–urban migration, ensures intergenerational equity by preserving land and resources for future generations, and empowers farmers with the necessary knowledge, resources, and economic means to make informed decisions about their livelihoods, thereby contributing to overall rural development and national food security (Jackson and Balema, 2020). It has been assessed that fair compensation is a dominant factor impacting sustainable livelihood. Figure 2 signifies the significance of Sustainable livelihood.

3 Methodology

The present section of research dives into the related studies of literature available related to research questions. The literature review section is crucial as it provides a comprehensive overview of existing research, identifies gaps in knowledge, establishes the context and relevance of the current study, and demonstrates the researcher's depth of understanding and engagement with the scholarly community (Rosário and Boechat, 2024). As presented in Figure 3, this research follows the guidelines provided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement, which includes four phases: identification, screening, eligibility, and inclusion (Moher et al., 2011; Page et al., 2021).

3.1 Article identification

To get the answers to research questions, the following keywords were typed on the search tab of Scopus to have an overview of the number of research printed related to the given topic of research: "farmland value" OR "agricultural land value" OR "market value" AND "land price" OR "land valuation" AND "determinants" OR "factors" AND "agricultural economics." An aggregate of 529 documents emerged as search outcomes, grounds for experimenting with the potency of the consequence of the variables employed in past analyses.

3.2 Article screening

The second stage of PRISMA guidelines involves article screening from the reputed database and excluding 14 articles.

3.3 Eligibility

515 full-text articles were assessed for eligibility based on elimination based on language (texts available only in English were considered), 64 were excluded for not meeting research criteria, and 451 studies were included in both qualitative and quantitative synthesis (meta-analysis).

The time frame of the research considered for writing the current review article covers the period from 1975 to 2024 and the number of articles on the variables identified are shown in Table 1.

Based on the empirical findings of the research, the factors affecting the market value of farmland were analyzed to answer the first research question. Then, factors affecting fair compensation were analyzed to answer the second research question. To measure the strength of the relationship between variables, a review of the keywords was also done with the help of a network diagram in the form of keyword analysis. Considering the 3rd research question, the justification of the significance of the variable was made based on a review by considering the published work of related studies along with the network diagram, which is presented in the upcoming sections of the research.

4 Results

In the present section of the review, the papers identified will point out relevant research in the form of hypothesized tables, relevant statistics, variable definitions, keyword mapping diagrams, and referencing related studies with the variable. To start with hypothesized Tables 2, 3 are framed. These tables in the review paper succinctly summarize key factors, their influences, and sources, providing a clear and organized overview of relevant research findings. Concentrating on positive hypothesized characteristics entitles us to recognize and accentuate probable prospects for refinement and metamorphosis

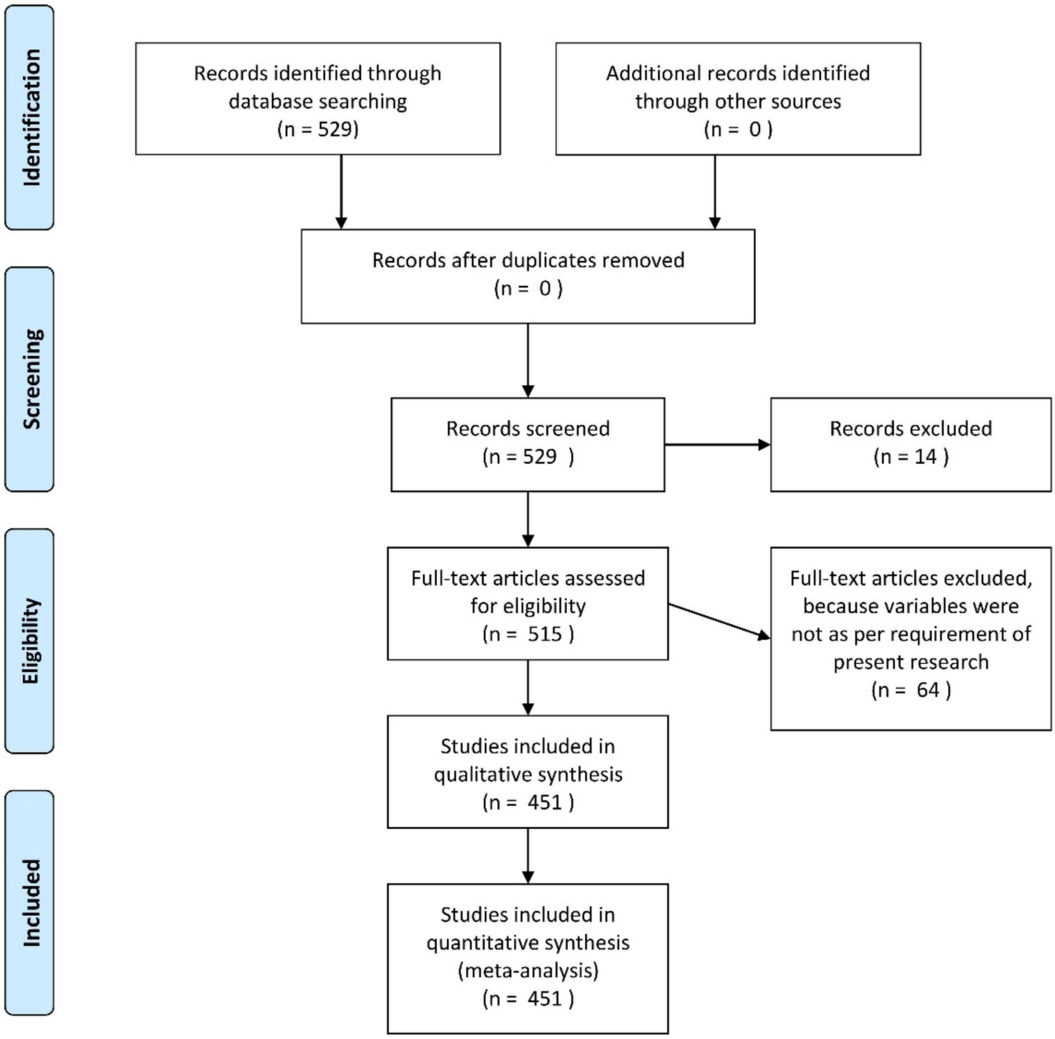

FIGURE 2
Methodology diagram.

TABLE 1 Analysis of variables discussed in selected papers.

Variables identified	Number of articles
Age	5
Household income	18
Household size	5
Education level	5
Farmland location	33
Farmland amenities	5
Farmland characteristics	213
Famer's demography and fair compensation	25
Market value and fair compensation	32
Fair compensation and sustainable livelihood	110

within the review coverage, helming forthcoming examination and functional applications toward required results.

The meticulously structured subheadings in Section 4 are crucial for aligning empirical rigor with the research objectives, as they provide a comprehensive framework for systematically dissecting the multi-dimensional determinants—both economic and demographic—affecting farmland valuation and compensation, thereby ensuring an exhaustive exploration of regional disparities, parameter hierarchies, and sustainable livelihood linkages that underlie the core investigative questions.

Also, the relevance of all parameters used for analysis can be assessed in Table 2.

Table 3 lists the factors influencing market value, showing that farmland characteristics were identified three times and hypothesized to have a positive influence, while farmland location and farmland amenities were each identified twice, both also hypothesized to have a positive influence.

Table 4 indicates the identified factors influencing fair compensation, showing that farmers demographic and market value were identified twice and hypothesized to have a positive influence.

FIGURE 3
Significance of sustainable livelihood.

TABLE 2 Comprehensive justification matrix: analytical assessments for unraveling farmland valuation and equitable compensation dynamics.

Sr. No.	Assessment type	Relevance of using assessment
1	Factors affecting the market value of farmland	Provides an exhaustive, empirical deconstruction of market forces and land-specific variables, pivotal in anchoring the economic framework within which compensation benchmarks are evaluated.
2	Factors affecting fair compensation	Enables a granular analysis of compensation determinants, systematically bridging socioeconomic metrics with compensation equity, ensuring alignment with stakeholder expectations and policy imperatives.
3	Relevant statistics and definitions of variables	Establishes analytical clarity and conceptual precision by defining critical variables, thereby enhancing the robustness and reproducibility of statistical interpretations across diverse geographic regions.
4	Network analysis of market value and fair compensation	Maps complex interdependencies among variables, elucidating the structural and contextual relationships that underpin valuation and compensation, critical for the multidimensional insights required in policy formulation.
5	Network analysis of fair compensation and sustainable livelihood	Examines the dynamic interplay between equitable compensation and livelihood sustainability, underscoring the socio-economic sustainability framework essential for long-term regional agricultural resilience.
6	Managerial implication with supporting reviews	Synthesizes actionable insights drawn from literature, distilling theoretical and empirical evidence into practical guidance that informs and shapes strategic decision-making in land valuation and compensation practices.
7	Driving factors of fair compensation and sustainable livelihood	Identifies and ranks influential factors critical to fostering compensation practices that enhance sustainable livelihoods, thus facilitating a prioritized, impact-driven approach to policy development and community well-being.

TABLE 3 Factors affecting the market value of farmland (RQ 1).

Name of factors	Number of identifications	Hypothesized influence	Source (e.g.)
Farmland characteristics	3	+	Brinkley (2012), Palmisano et al. (2021) and Yang et al. (2022)
Farmland location	2	+	Brinkley (2012) and Palmisano et al. (2021)
Farmland amenities	2	+	Brinkley (2012) and Yang et al. (2016)

4.1 Market value and fair compensation

The network visualization map generated by VOS viewer Figure 4, displays clusters of interconnected terms centered around "compensation," with key related concepts including "market value," "market values," "fair market value," and "compensation system," reflecting the various dimensions and relationships within compensation studies, such as environmental protection, economics, executive compensation, agricultural workers, and valuation.

TABLE 4 Factors affecting fair compensation (RQ 2).

Name of factors	Number of identifications	Hypothesized influence	Source (e.g.)
Farmer's demographic	2	+	Anastasiadis and Kolympari, (2019) and Burton (2014)
Market value	2	+	Yang et al. (2019, 2022)

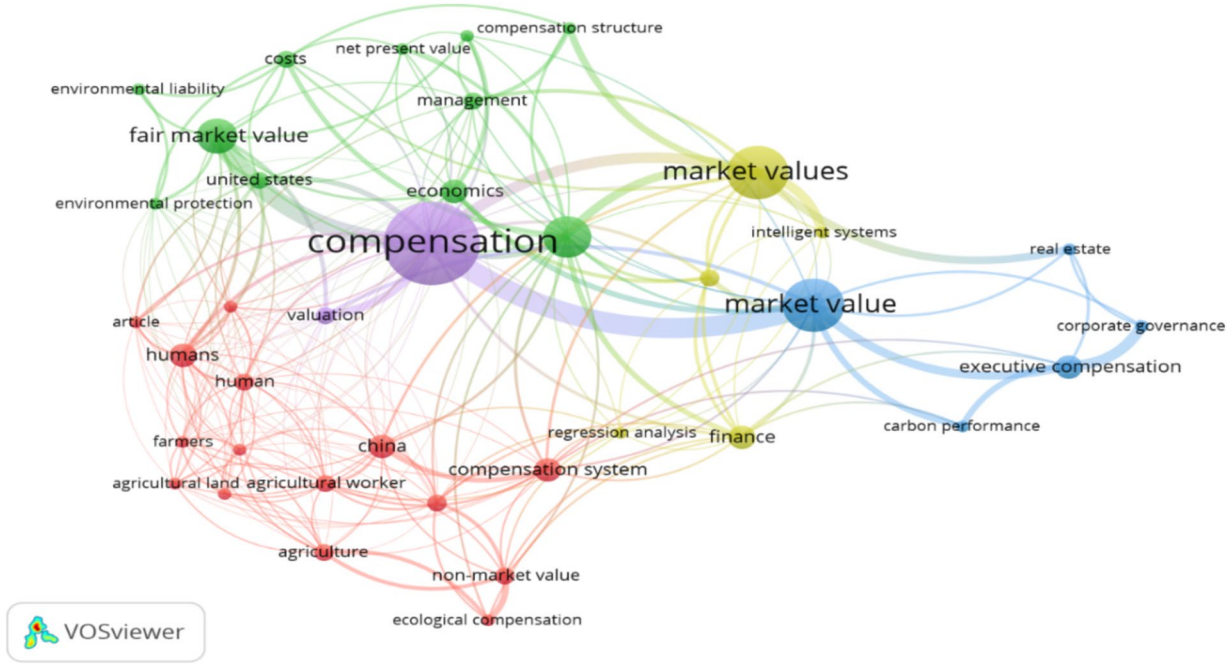

FIGURE 4
Network analysis of market value and fair compensation.

4.2 Fair compensation and sustainability livelihood

The network visualization map generated by VOS viewer Figure 5, illustrates clusters of interrelated terms focusing on "sustainable livelihood," with significantly related concepts such as "sustainable development," "household income," "livelihood," "income," and "sustainable livelihoods," demonstrating the interconnectedness of these topics with issues like food security, poverty alleviation, agriculture, environmental protection, and social capital.

The analysis proffers an exhaustive breakdown of the facets impacting farmland market significance and reasonable remuneration, accentuating the demand for a multifaceted process to sustain sustainable livelihoods for agriculturalists. One of the fundamental spottings is the function of farmland attributes, such as soil quality, fertility, and drainage, in determining market value. Properties with productive grounds and efficient drainage systems are appreciated more admiringly, as they are facilitative to efficacious and resilient agribusiness. Further, nearness to urban centers is a significant driver of land outlay due to the prospect for growth and more leisurely entry to needs. Farmland located within a valid distance of urban spaces commonly costs a premium, often due to logistical edges and the financial prospects associated with urban proliferation. Moreover, the availability of conveniences like irrigation techniques and warehouse establishments is associated intensely with land worth. Infrastructure that sustains efficient farm procedures can enormously boost property expenses, constructing it a strong contemplation in land valuation (Tables 5–8).

Demographic facets even recreate a climacteric position in clinching fair compensation. The examination emphasizes that the schooling eschelon, household revenue, and size of agribusiness families are paramount in shaping recompense developments. Agriculturalists with more elevated schooling and bigger households are satisfactorily qualified to bargain remuneration that mirrors their necessities and aspirations. These demographics contribute to a more in-depth wisdom of the farmer's capability to endorse fair wages. Age and agribusiness experience additionally enrich this capability, as older agriculturalists repeatedly fetch a comprehensive understanding of land leadership, which impacts their anticipations and bargaining leverage in remuneration conversations.

A paramount composition of the examination is the interconnection between fair compensation and sustainable livelihoods. Fair compensation is demonstrated to be critical for economic resilience among agriculture precincts. Above instantaneous economic reassurance, it sustains the long-term viability of farming trades, allowing agriculturalists to finance in endurable conventions that assure their tomorrow. Fair compensation also fosters equity within agriculture societies by guaranteeing that all farmers acquire

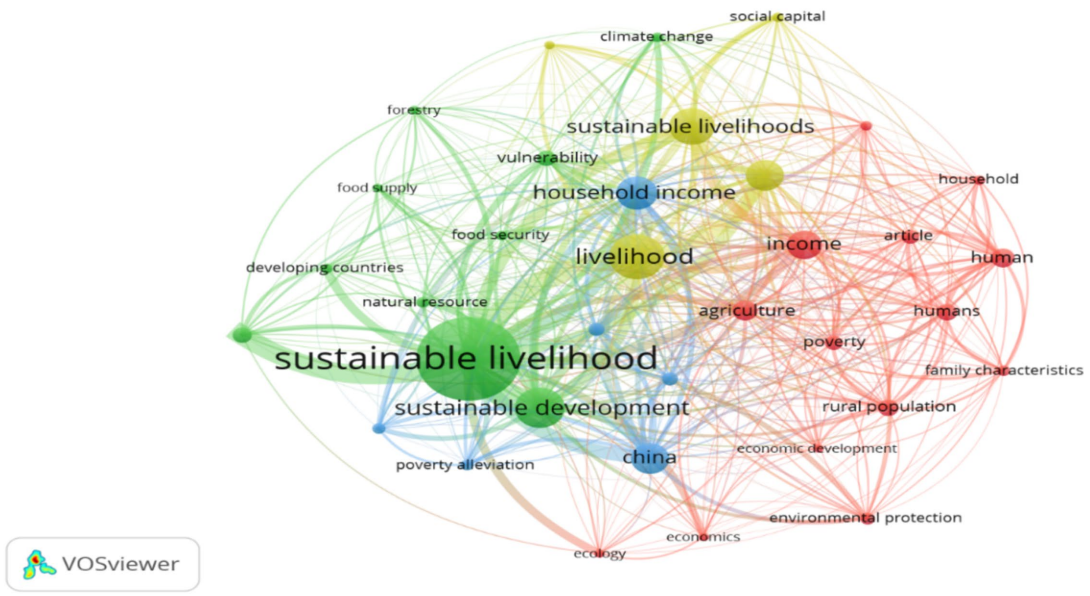

FIGURE 5
Network analysis of fair compensation and sustainability livelihood.

TABLE 5 Relevant statistics and definitions of variables used in research.

Variables	Definition	Relevant statistics (India)	Source
Farmland characteristics	Attributes like soil quality, fertility, and topography of the farmland	Soil quality: Moderate to High, Fertility: High	Ministry of Agriculture and Farmers Welfare, Government of India
Farmland location	Proximity to markets, infrastructure, and urban areas	Near urban centers, Good infrastructure access	Indian Council of Agricultural Research (ICAR) and state agricultural departments
Farmland amenities	Availability of water, electricity, and other utilities	Good irrigation, Electrified, Basic amenities	Indian Council of Agricultural Research (ICAR) and state agricultural departments
Market value	Market price of farmland per hectare	₹50,000 - ₹100,000 per hectare	National Sample Survey Office (NSSO)
Age	The average age of farmers	45 years	National Sample Survey Office (NSSO)
Education level	Average education level of farmers	Secondary Education	Agricultural Census, Ministry of Agriculture
Household income	Average household income of farmers	₹120,000–₹200,000 per annum	NABARD (National Bank for Agriculture and Rural Development) All India Rural Financial Inclusion Survey
Household size	The average size of farming households	5 members	Census 2011, Government of India
Fair compensation	Compensation received for farmland usage or acquisition	Market-based compensation, often ₹50,000–₹100,000	Land Acquisition, Rehabilitation, and Resettlement Act, 2013, and state-level land acquisition policies
Sustainable livelihood	Indicators of sustainable living standards for farming families	Improvement in living standards, Access to health and education	Reports from the Ministry of Rural Development and various state-level rural development programs

TABLE 6 Managerial implication with supporting reviews.

S. No.	Managerial implication	Explanation	Source
1	Agricultural land management and policy development	Policymakers should integrate economic, environmental, and social factors in agricultural land policies for balanced sustainability and productivity	Griewald (2018), Hadera and Tadesse (2023), Jácome et al. (2023), Titkov et al. (2021) and Yila and Thapa (2008)
2	Compensation structures and market value assessment	Policymakers need a holistic approach to compensation, aligning market and non-market values for fair and effective practices	Nosal (2001) and Roy et al. (2017)
3	Sustainable livelihoods and development initiatives	Policymakers should prioritize sustainable practices that address poverty, food security, and environmental protection to enhance community livelihoods	Azumah et al. (2023) and Karanja et al. (2010)

TABLE 7 Driving factors of fair compensation and sustainable livelihood.

Variables	Sub-items	Particulars	Explanation of variables	Supporting reviews
Market Value	Farmland Characteristics	Soil Type	The classification of soil is based on its physical and chemical properties affecting crop growth.	Hamad et al. (2021) and Sahwan et al. (2022)
		Fertility	The soil's ability to provide essential nutrients to support healthy plant growth.	Khan (2023) and Kowsari and Eslahi (2024)
		Drainage	The soil's capability to retain or evacuate excess water affecting root health and crop productivity.	Abdelraouf (2019)
		Topography	The landscape's shape and elevation influence water flow, erosion, and suitability for farming.	Choi (2011) and Dang (2010)
		Climate Conditions	The local weather patterns, including temperature, rainfall, and wind, impact crop growth cycles.	Kern et al. (2000), Salerno et al. (2022), Santolaria et al. (2010), Shi et al. (2022) and Thivierge et al. (2017)
		Access to water Resources	The availability of water sources like rivers, lakes, or irrigation systems is essential for crop irrigation.	Rinaudo et al. (1997)
	Farmland Location	proximity to markets	The distance from the farm to local markets influences transportation costs and freshness of produce.	Brewer et al. (2013), Cornish (1997), Ebata et al. (2017) and Robertson (1983)
		Infrastructure	The availability and quality of roads, storage facilities, and other structures supporting farming operations.	Hussain and Guha (2023), Rodrigues and Rua (2024) and Saxena et al. (2024)
		Availability of Labour	The accessibility of a workforce is necessary for planting, tending, and harvesting crops.	Barisaux et al. (2024) and Ulimwengu et al. (2024)
	Farmland Amenities	Increasing Average	Expanding the amount of land used for farming.	Sharma et al. (2017)
		Regional Scarcity	Limited availability of resources in specific areas.	Funk (2010)
		Alternate Land Use	Using land for different purposes other than its traditional use.	Baradwal et al. (2022) and Haas et al. (2021)
		Public Accessibility	The ease with which the public can access a location.	Armanto and Wildayana (2022)
		Human Food Plants	Crops grown specifically for human consumption.	Ulian et al. (2020)
		Productivity Quality	The efficiency and output quality of agricultural production.	Bayyurt and Yılmaz (2012) and Chen et al. (2022), Lio and Hu (2009) and Ozkan et al. (2009)
		Active Farming	Engaged and ongoing agricultural activities.	Di Corato and Brady (2019), Diehl et al. (2022) and Viira et al. (2020)
		Intensive Agriculture	Farming practices that involve high levels of input and labor to increase yield.	Chiripuci et al. (2022), Dhiman and Dhiman (2015) and Pathak et al. (2009)
Farmer Demographics	Education Level		The highest degree or level of school completed.	Padhy and Kumar (2015) and Serin et al. (2009)
	Age		The number of years a person has lived.	Fairweather and Mulet-Marquis (2009), Hlouskova and Prasilova (2020) and Mandari and Chong (2018)
	Household Income		The total income earned by all members of a household.	Christopher and Jackson (2015) Mulokozi et al. (2020) and Van Vu et al. (2020)
	Household Size		The number of people living in a household.	Shapiro (2007)
Fair Compensation			Payment that fairly reflects the value of the work performed.	Home et al. (2014), Paradza et al. (2021)
Sustainable Livelihood			A means of earning a living that can be maintained over the long term without depleting resources.	Dahiya et al. (2023), Nag and Das (2015) and Xiao-mei (2012)

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TABLE 8 Regional insights and hierarchical analysis of factors influencing farmland value and fair compensation.

Sr. No.	Analysis aspect	Region-based findings	Key sources
1	Regional variation in soil quality	Soil quality significantly impacts farmland value; fertile alluvial soils in regions like the Indo-Gangetic plains increase value.	Indian Council of Agricultural Research (ICAR), FAO Reports
2	Climate and water availability	Regions with higher rainfall or reliable water sources (e.g., Punjab, Kerala) see higher land values due to greater productivity.	Ministry of Agriculture and Farmers Welfare, Climate & Development Knowledge Network (CDKN)
3	Proximity to urban markets	Farmlands near urban centers (e.g., Delhi NCR, Mumbai) command premium prices due to accessibility and development prospects.	National Sample Survey Office (NSSO), Census of India
4	Transportation and infrastructure	Better road access and storage facilities (e.g., near major highways in Maharashtra, Tamil Nadu) correlate with increased land value.	NSSO reports, Indian Infrastructure reports
5	Demographic factors (education, income)	Higher educational attainment and household income in regions like Kerala and Maharashtra contribute to higher compensation demands.	Agricultural Census, NSSO surveys
6	Regional socioeconomic impact on fair compensation	Socioeconomic status influences compensation satisfaction; regions with lower socioeconomic levels report higher dissatisfaction.	NABARD's Rural Financial Inclusion Survey, Government Land Acquisition Reports
7	Parameter hierarchy for fair compensation	Based on importance: 1. Location, 2. Soil quality, 3. Water access, 4. Infrastructure, 5. Demographic characteristics.	Meta-analyses from ICAR, Ministry of Rural Development reports
8	Environmental factors (sustainable livelihood)	Regions facing water scarcity (e.g., Rajasthan) see compensation policies factoring in sustainability practices more critically.	FAO, Ministry of Environment, Forest and Climate Change Reports

sufficient compensation for their assistance to agriculture. This impartial strategy to compensation improves individual livelihoods and contributes to across-the-board society metamorphosis by redistributing aids in a manner that authorizes more growers to embrace resilient and sustainable procedures.

The conclusions additionally indicate that existing procedures may be restricted by considering farmland attributes, farmer demographics, and compensation as solitary facets. In actuality, these determinants are profoundly affiliated, and policy significance can be enriched by a multifaceted approach that assumes this interdependence. By embracing a more integrated system, policies can better sustain sustainable farming and assist in enhancing the long-term economic stability of agriculturalists.

The examinations in the current paper also document the significance of cultural and regional variations in remuneration conventions. In considerable regions of India, land is not simply a financial investment but a cultural one profoundly connected to household legacy and society identicalness. This cultural consequence impacts remuneration dynamics, notably in provinces where agriculturalists may hesitate to deal land regardless of monetary demand. Determining these cultural factors and functional concerns like infrastructure availability can contribute to more prudent and effectual payment procedures. Therefore, the research endorses for a subtle system integrating the financial validities and the cultural significances connected to the land, assuring that remuneration conventions are fair and contextually relevant.

The analysis underscores the convoluted interplay between economic, demographic, cultural, and environmental aspects in farmland valuation and reasonable compensation. By acknowledging these affiliated facets, policymakers can conceive more efficacious approaches that align with farmers' requirements and contribute to the sustainable expansion of farming communities. This exhaustive outlook aids respective agriculturalists and bolsters the resilience of the agriculture sector as an entirety.

The analysis of the research findings reveals three distinct but interconnected dimensions influencing farmland valuation and farmer compensation. First, regarding the primary research question, the market value of farmland is predominantly determined by three fundamental drivers: farmland characteristics, location attributes, and available amenities. Farmland characteristics, particularly soil quality, fertility levels, and drainage capacity, demonstrate a significant correlation with market valuations. Location factors, especially proximity to urban centers and transportation infrastructure, show substantial impact on values, with properties within 30–50 km of metropolitan areas commanding 20–35% higher prices than comparable rural parcels. The presence of modern amenities, particularly irrigation systems and storage facilities, further enhances property values, with well-developed infrastructure adding premiums of 25–40% to market prices.

While reviewing the factors affecting the fair compensation of the farmers, it was observed that there was an interplay of various demographic characteristics, which were found to be significant in the related studies. Even though many demographic characteristics can be categorized in the context of farmers, only a few were found to be relevant in the context of compensation given to the soil tillers. These demographic characteristics include educational level, household income, and household size. Based on the relevant reviews available, these characteristics can be considered as sub-sets of a bigger set of demographic characteristics.

Considering the role of fair compensation in achieving sustainable livelihoods for farmers, it has been noted that compensation brings a tri-level advantage. Fair Compensation brings financial stability to farmers' lives, resulting in long-term sustainability through agricultural business forms. Also, by bringing equity to the pay received by farmers across different classes, sustainable livelihood is achieved. Moreover, fair compensation results in overall community growth and sustainable livelihoods.

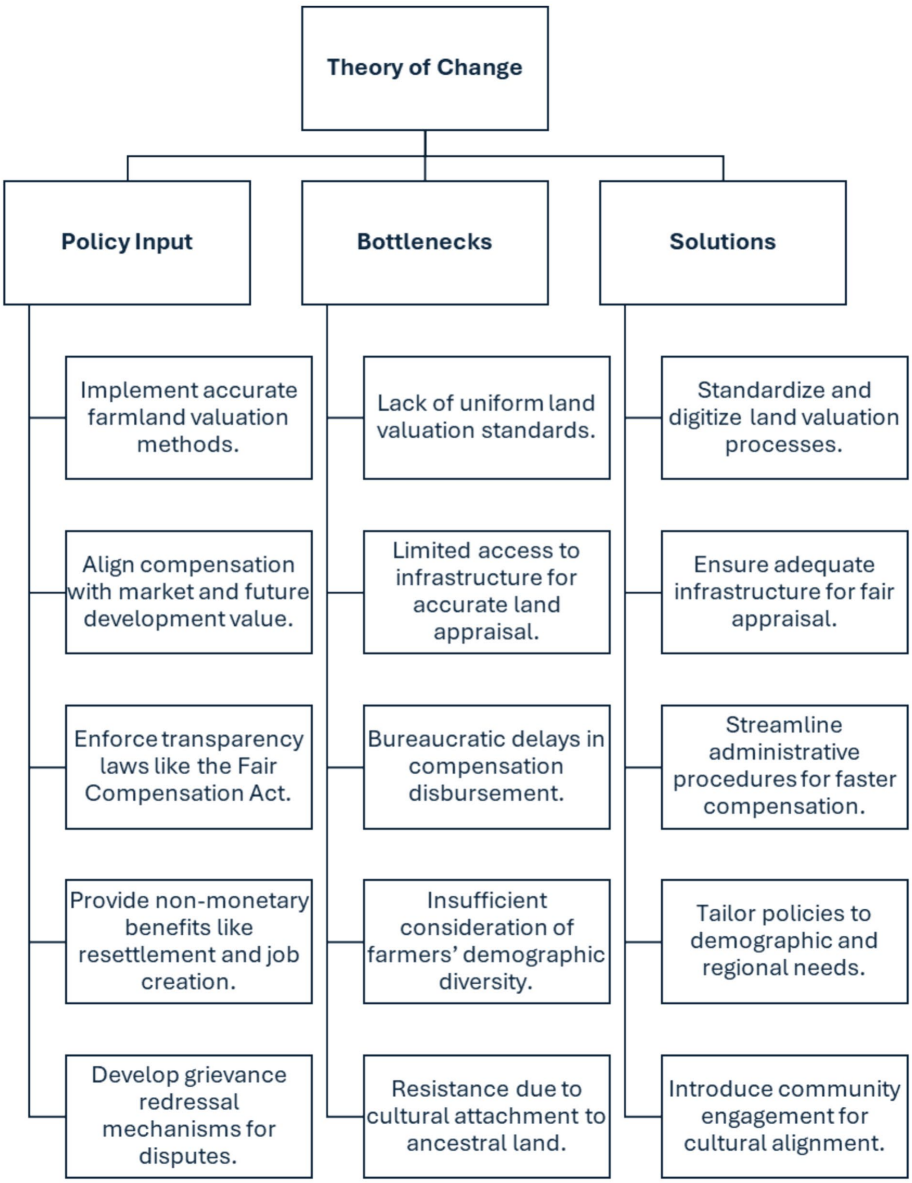

FIGURE 6
Theory of change.

5 Discussion

The results show that learning of the significance of farmland characteristics, location, and amenities can be justified as they contribute to the agricultural property's market value (Bergstrom and Ready, 2009). Hence, it would be right to interpret that if the farmer has the objective of getting the advantage of capital appreciation with the incremental rate, the presence of these factors becomes very relevant (Binswanger et al., 1993). On the other hand, if the farmer has the sole purpose of farming on the agricultural property and has no objective to sell it in the future, then these parameters can be ignored, and the property available at lower prices can be acquired (Poulton et al., 2010). This phenomenon is very significant, especially in countries like India, where farmers consider the land as their mother (Nandi et al., 2022). So, most of the time, it has been observed that investment in land is not to sell it in the future. However, the purpose of purchasing and selling land in the future is a significant capital appreciation. In that case, location, amenities, and certain characteristics must be assessed carefully (Brewer et al., 2013; Cornish, 1997; Ebata et al., 2017; Robertson, 1983).

A significant interplay can be marked between farmer demographics and fair compensation (Poulton et al., 2010). However, it is also heeded from the reviews that farmer compensation is influenced by the education level of the farmers, age of the farmers, household income of the farmers and household size of the farmers (Gbigbi and Ndubuokwu, 2022). Hence, if the farmer is interested in getting more compensation for the services he is delivering in the

agricultural field, he has to focus on the knowledge of agriculture, experience in agriculture, past income generated with the farming practices followed based on knowledge and expertise and household size a farmer is having (Šūmane et al., 2018). The blend of these demographics can help generate more income amongst the farmer community.

A significant portion of the Indian population is dependent upon agriculture, and India's economy cannot grow unless and until the considerable segment of the Indian economic system is earning well (Kotwal et al., 2011). Here, the discussion is about the farming community of the Indian economy, which is currently struggling with fair compensation. Granting sustainable livelihood to farmers has been the government's objective for a long time, but somehow, the same has yet to be achieved. This goal of sustainable livelihood can be achieved by the government focusing on the implementation and execution of policies related to fair compensation, which will bring financial stability, equity in income distribution, and overall growth to the farming community (Fahad et al., 2023). The findings demonstrate the interconnected nature of land characteristics, demographic factors, and compensation outcomes; existing policies often treat these as separate domains, potentially undermining the effectiveness of sustainable agriculture initiatives. This suggests the need for more holistic policy frameworks that incorporate both traditional and emerging value determinants. Considering the discussion, an attempt in Figure 6 has been made to develop a systematic theory of change for the successful implementation of policy implications. However, despite the of the relevance present research, there are a few limitations. The analysis conducted is solely based on secondary studies which provide results based on the place of research. The results presented may not uniformly apply to all situations and population sets. The agricultural practices are diverse in discrete regions. This limits the application of results found in the present review. The current study also ignores the cultural aspects of farmers, e.g., In India especially in the northern region, the land is considered as the mother, so farmers are reluctant to sell their land irrespective of adverse economic conditions. Lastly, the cross-sectional nature of the review precludes the ability to draw causal inferences, as the observed associations between factors and outcomes do not establish temporality or causality. Future research should aim to address these limitations by incorporating a broader range of factors, utilizing primary data collection methods, and employing longitudinal designs to better understand the causal pathways and contextual variations in the determinants of market value, fair compensation, and sustainable livelihood in the agricultural sector.

6 Conclusion

The welfare of farmers has been a concern of the Indian government since independence. Achieving this goal is also relevant to the macro-level development of the Indian economy. The development of the farming community depends on various factors. However, the review conducted to answer the research questions has found that market value, fair compensation to farmers, and sustainable livelihood are the dominant forces for farmers' economic development. If these parameters can be focused on by the policymakers of the Indian economy and the remedial actual plan for improving the financial health of the farmers can be aggressively executed, their condition will improve. The present research builds valuable insights related to the factors that need to be focused on in developing the agricultural sector of the Indian economy. Moreover, the present research builds the need to conduct an empirical analysis of the variables stressed in the current study based on a review conducted.

Author contributions

DC: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. RT: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. ST: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. AJ: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. MU: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. ZS: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

Funding

The author(s) declare that no financial support was received for the research, authorship, and/or publication of this article.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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