Multidimensional Financial Inclusion Index for the Scheduled Tribes of Kerala

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Abstract

Purpose : The present study aimed to develop a novel financial inclusion index (FII) that could be applied to measure the level of financial inclusiveness of scheduled tribes of Kerala and to estimate and compare the degrees of financial inclusivity among Kerala's scheduled tribe communities using index values.

Methodology : The study computed the FII for 21 distinct communities of scheduled tribes residing in Kerala by suggesting an exclusive multidimensional index for financial inclusivity.

Finding : The FII showed a minor improvement in a few populations, with the Malappuram and Palakkad tribes having poor financial inclusion. Communities with more financial inclusion typically had higher human development index (HDI) and literacy rates. However, just a handful progressed from weak to mid-inclusion, while low HDI, widespread illiteracy, and insufficient banking facilities hampered higher inclusion levels.

Practical Implications : Structural changes to the policy framework were necessary to ensure that all communities had an equal degree of financial inclusivity and offered monetary services to the poorest of the poor at no cost or a reduced cost in order to promote sustainable, inclusive growth.

Originality : This research introduced a novel multidimensional financial inclusion index (MFII) that was specifically designed to assess the financial inclusion of Kerala's scheduled tribes, incorporating both supply- and demand-side indicators to deliver a comprehensive evaluation of their financial access and participation.

Keywords : **multidimensional, financial inclusion index, weaker section, inclusive growth, scheduled tribes, Kerala**

JEL Classification Codes : G00, G21, O16

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Economists, policymakers, and scholars have long argued for financial inclusion, if not usually under that name. The book *"Affluent Society"* of 1958 by John Kenneth Galbraith put forward the notion that economic improvement should be judged in the matter of equal access to economic opportunity rather than GDP growth. The book underlines the momentousness of assimilating the vulnerable populace into the economic structure to promote equitable growth. Inclusive finance is vital for sustainable economic growth, development, gender equality, and combating poverty.

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Financial inclusion necessitates equitable and affordable opportunity to avail of basic financial services. This will enable the low-income vulnerable groups to manage their finances efficiently, reduce poverty, and encourage sustainable development. According to past literature, financial inclusion encourages economic prosperity and reduces poverty (Erlando et al., 2020; Kim et al., 2018; Kodan & Chhikara, 2013; Morgan & Pontines, 2014; Obayori & Chidinma, 2020; Okoye et al., 2017; Ratnawati, 2020; Sarma & Pais, 2011; Sethi & Acharya, 2018; Van et al., 2021). Rangarajan (2008) described financial inclusion as guaranteeing that impoverished mankind has inexpensive ingress to financial amenities and credit. Financial inclusion also enlarges suppleness to shocks and stimulates gender equality by economically empowering women through financial resources, entrepreneurship, and decision-making authority (Adegbite & Machethe, 2020; Ghosh & Vinod, 2017; Kehinde et al., 2023; Pal et al., 2022; Sharan & Dale, 2019; Wani & Khanday, 2024).

There is a significant contrast between the availability of inclusive finance for urban and rural communities. Urban areas have some benefits, such as easily accessible financial institutions, enhanced infrastructure, better financial literacy (FL), digital services, and improved usage of bank accounts (Huang & Zhang, 2020). In contrast, the countryside suffers due to inaccessibility to financial enterprises, illiteracy, and low incomes (Huang & Zhang, 2020). Interventions like mobile banking, awareness programs, correspondence models, etc., are required to overcome these gaps. Social isolation is a by-product of financial marginalization, which makes access to services critical (Sen, 2000). According to Sathiyan and Panda (2016), FL has to be improved, and leveraging the use of existing bank branches may result in a preferable degree of financial insertion. The methods that different authors recommend to improve financial inclusion in rural areas vary. Bhattacharya and Chopra (2019) put forth the idea of utilizing peer-to-peer lending to shrink the divergence between urban and rural areas since the method can evolve a sustainable, complementary market to the conventional lending intermediation apparatus. Siddiqui and Siddiqui (2020) established that financial inclusion is impacted by socioeconomic attributes. Joseph et al. (2023) stressed the association between inclusive finance and FinTech activities.

Financial inclusivity plays a tremendous role in encouraging economic empowerment; however, vulnerable groups, such as Scheduled Tribes, still face significant hindrances to accessing official banking services. Many people in India, including marginal farmers, unorganized laborers, migrants, and other underprivileged groups, continue to be excluded despite numerous attempts due to illiteracy and irregular earnings. Current financial inclusion indexes frequently overlook the unique socio-cultural characteristics and geographic difficulties that these communities face. This study proposed to evolve a novel financial inclusion index (FII) that adapts all the relevant factors to provide a more pragmatic measurement of financial inclusion. The outcome of this investigation will abet financial institutions and policymakers in preparing focused actions to reduce financial inequalities and advance inclusive growth.

In the recent past, there has been a remarkable surge in the focus on research related to financial inclusion, especially with regard to underprivileged communities. This research develops a multifaceted FII for Kerala's 21 indigenous communities. While existing indices measure financial inclusion at broader levels, they often fail to capture the unique challenges faced by scheduled tribes. Although Sarma's FII (Sarma, 2008, 2012) served as the foundation for the development of this index, this emphasizes FL while differentiating between supply side and demand-side factors. Moreover, it assesses PMJDY's performance in increasing financial inclusion. The study advances a utilitarian framework for assessing and improving the financial well-being of scheduled tribes of Kerala that aligns with sustainable development goals (SDGs). Those who are living in isolated and economically underprivileged areas continue to be financially excluded despite a number of financial inclusion programs. Their distinct financial practices, institutional impediments, and sociocultural limitations were not adequately taken into consideration by the indices that are currently in use. Policy interventions were still insufficient in the absence of a rigorous measurement system. By developing a financial FII exclusively for scheduled tribes, this study

bridges the knowledge gap and provides a more thorough insight into their financial availability, usage, and access.

The results suggest that some tribal groups have made minor increases in financial inclusion while others, particularly in central regions, have fallen behind. Communities with more financial inclusion tend to have higher HDI and literacy rates. However, PMJDY has had a limited impact, with only a few tribes moving from little to moderate financial inclusion. Policy changes are required to provide affordable financial services to the most vulnerable people.

Survey of Literature

Inclusive finance is explained as providing people and businesses with accessible, cheap, and adequate financial products, explicitly humans who have habitually been prohibited from ritualistic banking. The literature frequently connects financial exclusion to social exclusion, emphasizing how certain people are alienated from mainstream society. According to Panigyrakis et al. (2002), finance exclusion refers to definite populations to obtain adequate access to financial services. This exclusion can take different forms, including geographical, social, economic, digital, and psychological exclusion (Kempson & Whyley, 1999). Banking outreach has increased through the influence of remedial measures; even then, considerable disparities exist between rural and urban populations (Chattopadhyay, 2011). Opening a bank account does not guarantee inclusive growth or constitute financial inclusion (Veluchamy & Lingaraja, 2020). Therefore, different determinants affect financial inclusion. Kavitha and Suman (2019) conducted a literature survey to reveal the key determinants of inclusive finance, which can be considered as a basis for developing a comprehensive FII. A bibliometric analysis carried out by Khongwir and Sharmiladevi (2023) provides in-depth insights into the factors that affect FL and financial inclusion. Reddy (2016) attempted to analyze 12 factors that were exclusively affecting the inclusive finance of the poor in India. The analysis found that a gap still has to be tackled in order to revamp the efficacy and usability of inclusivity for the financially inaccessible rural population.

Several studies have been involved in the development of the FII in India and around the world by utilizing a different set of determinants, timelines, and criteria. Sarma (2008) created a multidimensional FII that combines multiple dimensions into a sole score ranging from 0 to 1, with 0 designating absolute financial banishment and 1 representing perfect financial insertion. This index validates cross-country comparisons and is comparatively simple to calculate and understand. Gupte et al. (2012) focused attention on an absolute measure by incorporating additional factors, which was neglected in the earlier studies. Goel and Sharma (2017) put forth an index to assess the financial inclusivity of India by including three dimensions, integrating individual indices to get a final measure of financial accessibility. Cámara and Tuesta (2014) created a multifaceted index that incorporates both demand-part and supply-part variables for 82 nations. This index evaluated financial inclusion using three factors: usage, obstacles, and access, with weights generated endogenously via a two-phase principal component analysis. Kapoor and Mohandas (2023) introduced weights to the determinants of inclusive finance and measured the degree of inclusion for all the Indian states.

Ambarkhane et al. (2016) advanced a second indicator for inclusivity that incorporated both positive and negative aspects. Supply, infrastructure, and demand constituted positive variables, while population growth, legal stability, and corruption comprised negative variables. The total index combines these drag variables with the individual dimensions. Sethy (2018) focused on evolving a measure that could be applied to estimate inclusivity across economies and trace development over time. Sarma (2012) updated his initial index, adding weights to dimensions and including "mobile money" among traditional characteristics such as financial service penetration, accessibility, and usage. Hanivan and Nasrudin (2019) generated a complex weighted index exclusively for Indonesia by employing a "two-stage principal component analysis," providing due attention to

the "consumption" factor, followed by availability and access. To track the evolution of Turkey's economic system, Yorulmaz (2013) developed a comprehensive financial inclusion indicator. This index provides for regional comparisons and engages financial ingress factors using the "Euclidean Distance" calculation to lead to a score ranging from 0 to 1.

The research synthesis discovers a slippage in studies on the Indian context, exclusively measuring the inclusiveness of finance for scheduled tribes utilizing an extensive financial inclusivity index that incorporates both demand side and supply side factors. Scheduled tribes are particularly vulnerable to financial exclusion due to cultural barriers, geographic isolation, a lack of formal identity, and restricted financial services. Land ownership, education level, income, and the extent of participation in Government programs have an impact on the financial inclusion of such indigenous people (Sahoo et al., 2017). Financial ignorance is a prominent source of financial exclusion. Furthermore, there has been little research into the long-term usefulness of government programs such as PMJDY in increasing inclusive finance. This study tackles these deficiencies by means of a demand- and supply-side FII for 21 tribal tribes of Kerala. The suggested index combines multiple financial inclusion features into a single score spanning 0 to 1, with 1 representing perfect financial insertion and 0 indicating entire debarring.

Data and Methodology for Constructing the Index

This study is an applied index-based research, which develops a financial inclusion and index, and the same is applied to assess the extent of financial insertion later. This section outlines the data and methods applied for constructing supply metrics and demand-metric FII. The metrics for both supply-side and demand-side variables are expressed in the first segment. The second part explains the construction process applied to develop the modern FII.

Data

Incorporating both supply and demand metrics, the present research evolves an FII. The supply-side metrics incorporate the accessibility and availability of banking services from the provider's perspective. These measures assist in determining how well financial services reach underrepresented groups and how to improve service availability for equitable economic development. Demand-side metrics incorporate the approachability and usage of banking functions from the perspective of the end user. Using these metrics, practitioners and policymakers could evaluate the effectiveness of financial insertion efforts in meeting the needs of individuals, families, and enterprises, thereby increasing financial resilience and empowerment in communities.

Supply Side Factors

↳ **Banking Penetration :** It is the degree to which banking services are utilized under a definite population or geographic area. The percentage of people or households with ingress to and active operation of banking functions and products, including loans, savings accounts, checking accounts, and other investment instruments, is usually used to measure it. The ratio of the total sample elements to the number of bank account holders is used to compute it (d_1).

↳ **Banking Availability :** The availability of financial services in a particular location or community is referred to as banking availability. It includes the actual locations of banking outlets, ATMs, and other channels of distribution where customers can obtain banking products. It is calculated as a ratio of the size of bank branches for one thousand adult customers (d_2).

Demand-Side Factors

↳ **Banking Usage :** It is crucial to look into how clients use the services that the bank offers. A dormant bank account will not contribute towards financial inclusion. The indicator was measured as a proportion of active bank accounts to the total number of sample respondents (d_3).

↳ **FL and Awareness :** This includes assessments of people's capacity to make wise financial decisions as well as their awareness and comprehension of financial notions, services, and goods. The element was calculated as a ratio between financially literate respondents and the total number of respondents (d_4).

Methodology

The study utilizes multiple data sources. Primary information was gathered from 420 tribal respondents, 20 respondents equally from each of the 21 communities across Kerala through the convenience sampling method. The period of the study was from October 2023 to April 2024. The respondents were personally interviewed using a structured schedule that was pre-tested properly. Before any data was collected, the respondents gave their informed consent. Secondary data was sourced from the Census 2011 Human Development Index Status, The 2013 Report on the Socioeconomic Status of Scheduled Tribes, reports of Scheduled Tribes Development

Table 1. ***Community-Wise Distribution of Scheduled Tribes***

Sl. No.	Name of Community	Families	Population	Area of Habitation
1	Arandan/Aranadan	80	247	Malappuram
2	Wayanadankadar	174	673	Wayanad
3	Kudiya, Melakudi	195	911	Kasaragod
4	Mahamalasar	40	143	Palakkad
5	Palleyan/Palliyan/Paliyan	423	1,484	Idukki
6	Thachanadan Moopan	391	1,649	Wayanad
7	Malapanickar	236	982	Malappuram
8	Malampandaram	514	1,662	Kollam, Pathanamthitta
9	Adiyan	2576	11,221	Wayanad
10	Eravalan	1255	4,418	Palakkad
11	Hill Pulaya	960	3,415	Idukki
12	Irula	7617	26,525	Palakkad
13	Malasar	1267	4,201	Palakkad
14	Malayan	1461	5,550	Ernakulam, Thrissur, Palakkad
15	Mudugar	1274	4,668	Palakkad, Wayanad, Kannur
16	Paniyan	21605	92,787	Malappuram, Palakkad, Kozhikode
17	Kadar	545	1,974	Thrissur, Palakkad, Wayanad
18	Kattunaikan	5137	19,995	Kozhikode, Malappuram, Palakkad
19	Koraga	445	1,644	Kasargod
20	Kurumbar/Kurumbas	543	2,251	Palakkad
21	Cholanaikkan	101	409	Malappuram

Table 2. ***Reliability Values***

Dimensions	Number of Elements	Cronbach's Alpha	Interpretation
Banking Penetration	4	0.897	Good
Banking Availability	4	0.788	Acceptable
Banking Usage	4	0.845	Good
Financial Attitude	3	0.853	Good
Financial Behavior	6	0.745	Acceptable
Financial Knowledge	11	0.869	Good
PMJDY Awareness	10	0.789	Acceptable

Department, Government of Kerala, and the 2022 Working Group Report on Scheduled Tribes Development. Table 1 represents the community-wise distribution of the population, while Table 2 shows the reliability values.

Samples were selected from each community irrespective of their area of habitation. An equal proportion of 20 samples from each community were selected through the purposive sampling method.

A composite multidimensional FII was developed with two dimensions from the supply metric and another two dimensions from the demand metric. The index is similar to that of Sarma (2008, 2012) but with some major changes. The following is an explanation of the index dimensions that were applied in the study:

The calculation of selected dimension indices is presented below:

d_1: Banking Penetration *(BP)*:

$$BP = \frac{\text{Number of bank account holders}}{\text{Total number of samples}} * 100$$

d_2: Banking Availability *(BA)*:

$$BA = \frac{\text{Number of bank branches available within the selected geographical area}}{\text{Total population in the selected geographical area}} * 100$$

d_3: Banking Usage *(BU)*:

$$BU = \frac{\text{Number of active bank accounts}}{\text{Total number of sample}} * 100$$

d_4: Financial Literacy and Awareness *(FL)*:

$$FL = \frac{\text{Number of financially literate respondents}}{\text{Total number of sample}} * 100$$

Model Specification

The existing local and international literature on the aspects of financial insertion and the index's development serves as the foundation for the model specification. Three indicators—banking penetration, banking availability, and banking usage—are included in the current model (Sarma, 2008), with an additional demand-side indicator being FL and awareness.

The given formula is applied to determine the dimensional index:

$$Di = \frac{\text{Real value of BP} - \text{Minimal value of BP}}{\text{Maximal value of BP} - \text{Minimal value of BP}}$$

$$Dii = \frac{\text{Real value of BA} - \text{Minimal value of BA}}{\text{Maximal value of BA} - \text{Minimal value of BA}}$$

$$Diii = \frac{\text{Real value of BU} - \text{Minimal value of BU}}{\text{Maximal value of BU} - \text{Minimal value of BU}}$$

$$Div = \frac{\text{Real value of FL} - \text{Minimal value of FL}}{\text{Maximal value of FL} - \text{Minimal value of FL}}$$

Formula (1)

The formula resolves the index of financial inclusion:

$$FIIi = 1 - \frac{\sqrt{(1-d1)^2 + (1-d2)^2 + \ldots + (1-dn)^2}}{\sqrt{n}}$$

Formula (2)

In an *n*-dimensional Cartesian space, where each dimension $Di = (d1, d2, d3,....dn)$ indicates a measure of inclusive finance; the optimal point is $I = (1,1,1,...,1)$, whereas the worst point is $O = (0,0,0,...,0)$. Formula (2) normalizes the distance by dividing by *n* and subtracting from 1. This ensures that the IFI score ranges between 0 and 1. A higher IFI score indicates greater financial inclusion, with 0 amount to absolute financial debarring and 1 amount to full insertion. According to Sarma (2008), communities have three levels of financial inclusion: weak ($0 \leq IFI \leq 0.4$), moderate ($0.4 < IFI < 0.6$), and high ($0.6 < IFI \leq 1$).

Results and Discussion

This section reports on communities' performance across the state and in terms of FII. There are also results for states with low, moderate, and elevated financial inclusion in this section. This section also includes results on how PMJDY has improved finance inclusion.

The results and discussion are divided into two sections. To help readers understand the relationships between the essential factors, descriptive statistics were addressed in the second section and the findings of the FII were presented in the first. The supply-side and demand-side FII outcomes for the 21 Scheduled Tribal groups in Kerala are shown in Tables 3 and 4.

Table 3. ***Supply Side Financial Inclusion Index of Tribal Communities***

Sl. No.	Communities	Banking Penetration Index	Banking Availability Index
1	Arandan/Aranadan	0.64	0.12
2	Wayanadankadar	0.77	0.11
3	Kudiya, Melakudi	0.54	0.11
4	Mahamalasar	0.51	0.09
5	Palleyan/Palliyan/Paliyan	0.50	0.07
6	Thachanadan Moopan	0.79	0.10
7	Malapanickar	0.52	0.08
8	Malampandaram	0.51	0.07

9	Adiyan	0.57	0.08
10	Eravalan	0.50	0.08
11	Hill Pulaya	0.51	0.07
12	Irula	0.50	0.07
13	Malasar	0.51	0.08
14	Malayan	0.52	0.08
15	Mudugar	0.53	0.07
16	Paniyan	0.52	0.07
17	Kadar	0.51	0.08
18	Kattunaikan	0.49	0.08
19	Koraga	0.48	0.08
20	Kurumbar/Kurumbas	0.49	0.08
21	Cholanaikkan	0.48	0.07

Table 4. ***Demand-Side FII of Tribal Communities***

Sl. No.	Communities	Banking Usage Index	Financial Literacy and Awareness Index
1	Arandan/Aranadan	0.61	0.62
2	Wayanadankadar	0.75	0.87
3	Kudiya, Melakudi	0.41	0.54
4	Mahamalasar	0.30	0.29
5	Palleyan/Palliyan/Paliyan	0.21	0.56
6	Thachanadan Moopan	0.77	0.85
7	Malapanickar	0.47	0.43
8	Malampandaram	0.49	0.52
9	Adiyan	0.54	0.63
10	Eravalan	0.32	0.27
11	Hill Pulaya	0.23	0.67
12	Irula	0.34	0.25
13	Malasar	0.32	0.31
14	Malayan	0.35	0.25
15	Mudugar	0.33	0.28
16	Paniyan	0.34	0.35
17	Kadar	0.32	0.32
18	Kattunaikan	0.31	0.25
19	Koraga	0.27	0.29
20	Kurumbar/Kurumbas	0.33	0.33
21	Cholanaikkan	0.21	0.12

The banking penetration index evaluates financial inclusion through bank account ownership. A person with a bank account is considered financially included. According to Sarma (2008), access to a bank account is required

for inclusion, which is defined as "the process of ensuring vulnerable groups, such as weaker sections and low-income groups, have affordable access to financial services and timely and adequate credit."

Thachanadan Moopan has the highest banking penetration (0.79), suggesting that most of the respondents are banked, followed by Wayanadankadar (0.77), Arandan/Aranadan (0.64), and Kudiya, Melakudi (0.54). Most localities have scores above 0.50, with the exception of Kattunaikan, Kurumbar/Kurumbas, Koraga, and Cholanaikkan, which all have ratings below 0.50. The increased results are attributable to the involvement in the "Mahatma Gandhi National Rural Employment Guarantee Scheme," which frequently requires a bank account, as well as the impact of PMJDY in converting unbanked citizens to banked ones. However, banking availability is a prominent determinant of scheduled tribes' financial insertion. The Banking Availability (BA) index, which assesses the number of formal banking institutions in a region, ranks Arandan/Aranadan first (0.12), followed by Wayanadankadar and Kudiya, Melakudi (0.11). The communities with the lowest ratings (0.07) are Palleyan/Palliyan/Paliyan, Malampandaram, Hill Pulaya, Irula, Mudugar, Paniyan, and Cholanaikkan, indicating a lack of banking facilities in these locations.

Inoperative bank accounts, which function similarly to having no bank account, are a vital hindrance to financial insertion (Ozili, 2021). As a result, the banking usage index determines how many bank account holders conduct regular banking activities. Thachanadan Moopan has the highest score (0.77), followed by Wayanadankadar (0.75). Palleyan/Palliyan/Paliyan and Cholanaikkan score poorly at 0.21, indicating that many PMJDY accounts are inactive. FL is critical for increasing financial inclusion, according to numerous researchers (Bire et al., 2019; Grohmann et al., 2018; Grohmann & Menkhoff, 2021; Khan et al., 2022; Kodongo, 2018). The FL indicator shows good performance in Wayanadankadar (0.87) and Thachanadan Moopan (0.85). Hill Pulaya (0.67), Adiyan (0.63), and Arandan/Aranadan (0.62) also have high FL levels. Cholanaikkan has the lowest score of 0.12, indicating insufficient financial education, which has a fatalistic influence on financial insertion. Table 5 shows detailed rankings for the supply and demand-side financial insertion indices, as well as the overall community rankings.

Table 5. ***Financial Inclusion Ranking of Tribal Communities***

Sl. No.	Communities	Financial Inclusion Index (FII) Supply Side	Ranks	Financial Inclusion Index Demand Side (FII_D)	Ranks	FII	Ranks
1	Arandan/Aranadan	0.3282	R3	0.6152	R2	0.4717	R2
2	Wayanadankadar	0.3494	R1	0.8006	R1	0.5750	R1
3	Kudiya, Melakudi	0.2914	R4	0.2915	R4	0.2914	R4
4	Mahamalasar	0.2695	R7	0.2695	R6	0.2695	R6
5	Palleyan/Palliyan/Paliyan	0.2539	R15	0.2539	R16	0.2539	R15
6	Thachanadan Moopan	0.3466	R2	0.3464	R3	0.3465	R3
7	Malapanickar	0.2667	R9	0.2661	R8	0.2664	R7
8	Malampandaram	0.2568	R8	0.2567	R14	0.2567	R13
9	Adiyan	0.2822	R5	0.2819	R5	0.2820	R5
10	Eravalan	0.2696	R6	0.2596	R13	0.2646	R8
11	Hill Pulaya	0.2568	R13	0.2567	R14	0.2567	R13
12	Irula	0.2532	R16	0.2533	R17	0.2532	R16
13	Malasar	0.2631	R11	0.2628	R11	0.2629	R11

14	Malayan	0.2666	R10	0.2662	R7	0.2664	R7
15	Mudugar	0.2631	R11	0.2631	R9	0.2631	R9
16	Paniyan	0.2603	R12	0.2599	R12	0.2601	R12
17	Kadar	0.2631	R11	0.2629	R10	0.2630	R10
18	Kattunaikan	0.2560	R14	0.2561	R15	0.2560	R14
19	Koraga	0.2525	R17	0.2527	R18	0.2526	R17
20	Kurumbar/Kurumbas	0.2560	R14	0.2561	R15	0.2560	R14
21	Cholanaikkan	0.2468	R18	0.2465	R19	0.2466	R18

Wayanadankadar ranks first in the supply-side FII with a value of 0.3494, owing to its second-highest places in both the banking penetration and banking availability indices. Thachanadan Moopan has the greatest banking penetration index (0.79) but ranks second in the supply-side index with a score of 0.3466 due to its third-place position in banking availability (0.10). Arandan/Aranadan ranks third with a supply-side index score of 0.3282, followed by Kudiya, Melakudi (0.2914), and Adiyan (0.2822). Malasar, Mudugar, and Kadar are ranked 11 with an index of 0.2631, followed by Kattunaikan and Kurumbar/Kurumbas in 14 places with a score of 0.2560. Cholanaikkan is the lowest in the supply-side index, with a score of 0.2468. Wayanadankadar leads the demand-side index with a score of 0.8006, owing to the highest FL/awareness index (0.87) and the second-highest banking usage index (0.75). Arandan/Aranadan ranks second with a score of 0.6152, followed by Thachanadan Moopan (0.3464) and Kudiya, Melakudi (0.2915). Hill Pulaya and Malampandaram are tied for 14 places with a score of 0.2567, followed by Kattunaikan and Kurumbar/Kurumbas with a score of 0.2561. Cholanaikkan ranks bottom on the demand-side index, with a score of 0.2465.

Communities with High Inclusive Finance

On the supply side, no village reached high financial insertion, with Wayanadankadar, the highest-ranked, only reaching medium levels. This reveals gaps in the offering of economic services, such as bank branches and ATMs. On the demand side, only Wayanadankadar achieved a peak degree of inclusion, with an indicator score of 0.8006, suggesting significant financial knowledge and bank usage. Overall, no community achieved high financial inclusion due to the normalization effect, in which supply-side constraints, particularly in-service availability, reduced total index scores.

Communities with Medium Financial Inclusion

According to the supply-side index, only Wayanadankadar (0.3494) and Thachanadan Moopan (0.3466) fall into the medium financial inclusion category. Similarly, on the demand side, Arandan/Aranadan (0.6152) and Thachanadan Moopan (0.3464) have medium financial inclusion. Notably, Thachanadan Moopan delivers consistent results on both sides. Three communities in the total FII have medium financial insertion: Wayanadankadar (0.5750), Arandan/Aranadan (0.4717), and Thachanadan Moopan (0.3465).

Communities with Low Financial Inclusion

The majority of localities have low financial inclusion based on both supply-metrics and demand-metrics characteristics. On the supply head, 19 communities have an index score of less than 0.33, including Arandan/Aranadan (0.3282), Kudiya, Melakudi (0.2914), and Cholanaikkan (0.2468). Similarly, 18 communities

Table 6. ***Descriptive Statistics of Communities Grounded in Supply Part and Demand-Part Indicators***

	Supply Side	Demand-Side
Minimum	0.2468	0.2527
Maximum	0.3494	0.8006
Mean	0.2739	0.3124
SD	0.0302	0.1369
High FII communities	0	1
Medium FII communities	2	2
Low FII communities	19	18
Total communities	21	21

on the demand side have poor financial inclusion, including Kudiya, Melakudi (0.2915), Mahamalasar (0.2695), and Cholanaikkan (0.2465). In terms of the overall index, 18 communities are classified as having poor financial inclusion, including Kudiya, Melakudi (0.2914), Palleyan/Palliyan/Paliyan (0.2539), and Irula (0.2532). These findings underline the fact that the majority of the surveyed communities have low levels of financial inclusion.

Table 6 shows the depictive statistics for the FII in 21 Scheduled Tribal groups, with significant disparities between supply and demand indicators. FII scores ranged from 0.2468 to 0.3494 on the supply side and 0.2527 to 0.8006 on the demand side, with an average of 0.2739 and 0.3124, respectively. The standard deviations for supply and demand were 0.0302 and 0.1369, respectively. Under the low financial inclusion category, 19 towns were there on the supply metrics, and 18 were on the demand metrics. Arandan/Aranadan has low supply and medium demand inclusion, but Thachanadan Moopan has medium inclusion on both. Wayanadankadar is the sole community with high financial inclusion.

Theoretical Implications

This study advances the theoretical discussion on financial inclusion by evolving a unique FII for the Scheduled Tribes of Kerala. There were a number of indices that measured financial inclusion; however, the distinct socioeconomic and cultural elements of the scheduled tribes failed to be noticed by those indices. This study includes a more thorough framework for evaluating financial inclusion by including both demand-part and supply part factors. The proposed index can also be used for people who are in other parts of the world with the same sociocultural features. Furthermore, in line with behavioral finance theories that pinpoint the significance of financial awareness in economic decision-making, the results highlight the importance of FL as a vital factor of inclusivity. By providing a more sophisticated analytical approach to evaluate financial inclusion in vulnerable populations, these theoretical developments add to the knowledge base.

Conclusion, Limitations, and the Way Forward

Based on “Sarma's Financial Inclusion Index” and “UNDP Human Development Index,” this research explores a novel multidimensional FII to evaluate the inclusiveness of scheduled tribes of Kerala. The developed index can be applied to assess the level of financial insertion of a group of Indigenous people who possess common sociocultural characteristics. The current study has an application level that made use of the newly developed index to evaluate the level of financial insertion among the 21 tribal groups in Kerala, considering four main

indicators: two supply-side metrics and two demand-side metrics. Banking penetration and availability constituted supply metrics, whereas bank usage and FL constituted demand indicators. Separate FII values were calculated for each community. Wayanadankadar ranked top on the supply side, while Cholanaikkan placed last on the demand side. Wayanadankadar was the only community that had a strong financial inclusion position on the demand side, with a score of 0.8006. Wayanadankadar (0.3494) and Thachanadan Moopan (0.3466) were on the medium financial inclusion from the supply side perspective, whereas Arandan/Aranadan (0.6152) and Thachanadan Moopan (0.3464) had medium financial insertion from the demand side perspective. No community reached a top level of inclusion among the 21 communities. Three communities—Wayanadankadar (0.5750), Arandan/Aranadan (0.4717), and Thachanadan Moopan (0.3465)—were classified as medium financial inclusion. The remaining 18 villages were assessed as having low financial inclusion. The higher-ranked communities have higher levels of banking penetration and financial knowledge. However, lower ranks were influenced by insufficient banking availability, reflecting the region's lack of formal banking institutions, which restricts ingress to financial products.

From this inquiry, it is evident that schemes like PMJDY could be able to enlarge the number of banked people but failed in spreading FL and awareness, especially in areas of people who belong to particularly vulnerable groups. Therefore, the policy framework needs structural modifications. The development of people and FL in the mainland's less financially integrated populations should be the primary concerns of policymakers. Nevertheless, the advancement of financial inclusion among communities, particularly those from Malappuram, Kasaragod, Idukki, and Palakkad, depends heavily on governance and physical infrastructure.

The primary research restriction is the lack of data on different supply side and demand-side aspects of financial insertion. This limitation may be addressed in the future when more data becomes available. A policy perspective can also be applied to the assessment of the sequel of inclusive finance on economic performance and the decrease of poverty.

Authors' Contribution

Reshma K. conceived the idea of developing a new index for financial inclusion exclusively for the scheduled tribes of Kerala. Reshma K. and Dr. K. Kanniammal retrieved a few high-quality past research papers and filtered them using keywords. Both authors contributed to the development of the research methodology. Dr. K. Kanniammal oversaw and confirmed the analytical methods. Reshma K. conducted the interviews and collected data. Numerical computation was done by Reshma K., and Dr. K. Kanniammal cross-checked and verified the same. Reshma K. wrote the manuscript in collaboration with Dr. K. Kanniammal. Both authors ratified the final form of the manuscript.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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