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گردشگری روستایی و توسعهٔ محلی فراگیردر گوا، هند؛ ارزیابی چندبعدی آثار اقتصادی و اجتماعی

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تالوکاهای گوا، تحلیل حساسیت OECD، تراکم گردشگری، توسعهٔ فراگیر، شاخص ترکیبی توسعهٔ گردشگری روستایی (RTDI)، کندال تاو، گردشگری روستایی، مناطق ساحلی-داخلی، PCA.

چکیده

در این مقاله، با استفاده از نسخهٔ بازنگری‌شدهٔ شاخص توسعهٔ گردشگری روستایی (RTDI) اصلاح‌شده، آثار اقتصادی و اجتماعی گردشگری بر توسعهٔ روستایی ۱۲ واحد اداری زیرناحیه‌ای(تالوکا) درایالت گوا درهند ارزیابی شد. در این مطالعه، با استفاده از داده‌های رسمی سال مالی ۲۴-۲۰۲۳م، امتیازهای ترکیبی در ابعاد سهم اقتصادی، تنوع‌بخشی بازار، گرایش روستایی و شمول اجتماعی بررسی و خطای روش‌شناختی در شاخص جانشین گرایش روستایی که در کاربردهای پیشین طبقه‌بندی نادرست تالوکاهای داخلی را به‌دنبال داشت اصلاح شد. همچنین، شکاف توسعه‌ای میان مناطق ساحلی و داخلی اندازه‌گیری و بررسی شد آیا رشد کلی گردشگری در سطح لیللت‌با پیامدهای فراگیر در سطح محلی همخوانی دارد. برای این منظور، مجموعه‌ای چندمنبعی از داده‌ها بر پایهٔ هفت منبع رسمی دولتی جمع‌آوری شد: کتابچهٔ راهنمای آماری ۲۴-۲۰۲۳م (جدول ۷۷)، ISED-2025، «مجموعه داده‌های گردشگری هند ۲۰۲۵»، و داده‌های MoSPI PLFS طی سال‌های ۲۰۱۷ تا ۲۰۲۵. در این پژوهش بُعد گرایش روستایی در شاخص RTDI با استفاده از معکوس تراکم گردشگری مبتنی بر داده‌های مساحت سرشماری ۲۰۱۱م بازتعریف و جایگزین شاخص مبتنی‌بر نقطهٔ برش میانه شد؛ شاخصی که پیش‌تر به‌اشتباه، برای تالوکاهای روستایی امتیاز صفر تولید می‌کرد. همچنین، برازش حداقل مربعات معمولی (OLS) همراه با گزارش کامل آزمون‌های تشخیصی و و سه الگوی وزن‌دهی منطبق‌با استلندارددهای OECD، همراه‌با آزمون همخوانی رتبه‌ای کندال‌تاوبه کار گرفته شد. تحلیل مؤلفه‌های اصلی (PCA) نیز برای شناسایی محورهای ساختاری تفاوت میان تالوکاها استفاده شد. بر اساس الگوی وزن‌دهی برابر (W1)، تالوکای باردز با امتیاز RTDI برابر با ۰/۵۸۴ و به‌دلیل امتیاز اقتصادی غالب ۱/۰۰۰ رتبهٔ نخست را کسب کرد. همچنین، سنگوم (با رتبهٔ ۵، RTDI=۰/۴۵۸) و ساتاری (رتبهٔ ۶، RTDI=۰/۴۳۱)، به‌ترتیب در شاخص‌های تنوع‌بخشی و گرایش روستایی پیشتاز بودند. مقدار کندال تاو میان الگوی W1 و الگوی مبتنی‌بر اولویت روستایی W3 برابر بود با ۰/۰۶۱- (P=۰/۸۴۱) که نشان می‌دهد رتبه‌بندی‌های مبتنی‌بر وزن‌دهی برابر و اولویت روستایی هم‌بستگی معناداری ندارند. همچنین، لگاریتم حجم گردشگران رابطه‌ای معنادارباRTDI نشان داد (b=۰/۰۴۰، P=۰/۰۱۰، R^2=۰/۵۰۳). تحلیل PCA نیز مؤلفهٔ نخست (PC1) را که ۶۶درصد واریانس را تبیین می‌کند، محور اصلی توسعهٔ ساحلی-روستایی نشان داد. این پژوهش نخستین ارزیابی چندبعدی است از آثار گردشگری روستایی در سطح تالوکا در ایالت گوا و خطاهای پیش‌تر شناسایی‌نشده در مشخصات شاخص RTDI ودارای پیامدهای مستقیم در سیاستگذاری اصلاح شده است و نشان می‌دهد آمارهای تجمیعی در سطح ایالت به‌طور نظام‌مند دوگانگی توسعه‌ای میان مناطق ساحلی و داخلی را پنهان می‌کند؛ دوگانگی‌ای که تعیین می‌کند آیا گردشگری به پیامدهای فراگیر توسعهٔ روستای می‌انجامد.

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Rural tourism and inclusive local development in Goa, India: A multidimensional assessment of economic and social impacts

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Abstract

This paper evaluates economic and social impacts of tourism on rural development across Goa's 12 sub-district administrative units (talukas) using a revised Rural Tourism Development Index (RTDI). Using FY 2023-24 official data, it constructs composite scores across economic contribution, market diversification, rural orientation, and social inclusion, and corrects a methodological error in the rural orientation proxy that misclassified inland talukas in earlier applications. The study measures the coastal-inland development gap and assesses whether aggregate state-level tourism growth corresponds to inclusive local outcomes. A multi-source dataset is assembled from seven official government sources including DPSE Goa Statistical Handbook 2023-24 (Table 77), ISED-2025, India Tourism Data Compendium 2025, and MoSPI PLFS 2017-2025. The RTDI rural orientation dimension is re-specified using inverse tourism density derived from Census 2011 area data, replacing a median-cutoff proxy that produced erroneous zero scores for rural talukas. OLS regression with full diagnostic reporting and three OECD-compliant weight schemes with Kendall tau rank concordance are applied. PCA identifies structural axes of inter-taluka variance. Under the equal-weight scheme (W1), Bardez ranks first (RTDI= 0.584) through its dominant Economic Score (1.000). Sanguem (rank 5, RTDI= 0.458) and Sattari (rank 6, RTDI= 0.431) lead on diversification and rural orientation respectively. Kendall tau between W1 and the rural-dominant scheme W3 is -0.061 (P= 0.841), confirming that equal-weight and rural-priority rankings are uncorrelated. Log tourist volume is significantly associated with RTDI (b= 0.040, P= 0.010, R-squared= 0.503). PCA identifies PC1 (66.0% of variance) as the dominant coastal-rural development axis. This study provides the first taluka-level multidimensional rural tourism impact assessment for Goa, corrects a previously unidentified RTDI specification error with direct policy consequences, and demonstrates that aggregate state statistics systematically obscure the coastal-inland development duality that determines whether tourism generates inclusive rural outcomes.

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1. Introduction

Tourism is widely documented as a significant driver of rural economic diversification, livelihood improvement, and structural change in developing economies, particularly where agricultural employment is contracting and non-farm income sources are limited (UNWTO, 2021; Ashley & Roe, 2002; Scheyvens, 1999). In practice, however, distributional effects depend critically on the spatial and structural character of tourism development. In coastal economies, economic gains frequently concentrate in coastal zones and established commercial interests, while inland areas and subsistence communities receive limited direct benefit (Richards, 2021; Chok et al., 2007; Zhao & Ritchie, 2007).

The case of Goa is particularly important to study for three reasons that go beyond its descriptive interest. First, Goa is India's most tourism-dependent state economy by per-capita metrics: tourism contributes an estimated 15-18% of GSDP, yet the sub-district distributional consequences of this dependence have never been quantitatively assessed. Second, the national policy context creates urgent measurement needs: the Swadesh Darshan 2.0 scheme and the revised Homestay Policy specifically target inland talukas for tourism investment, but no baseline measurement framework exists against which to evaluate whether these investments are generating rural development outcomes. Third, Goa provides an analytically tractable case of the coastal-inland duality documented in Global South tourism economies more broadly (Choudhary et al., 2025; Geng et al., 2025), where the combination of an internationally recognised coastal resort sector and a poorly integrated inland hinterland allows structural distributional patterns to be identified clearly at a sub-national scale.

Goa recorded 80.83 lakh total tourist arrivals in FY 2023-24, with 9,005 hotels and guest houses by FY 2024-25 (ISED-2025). Yet sub-district data from DPSE Goa Statistical Handbook 2023-24 (Table 77) show that total tourist arrivals across the state's 12 talukas have a coefficient of variation of 153.6%: Bardez receives 32.91 lakh tourists while Sattari receives 0.86 lakh, Quepem 0.19 lakh, and Dharbandora 0.61 lakh. This distributional profile is consistent with a coastal concentration pattern rather than broad-based rural tourism development.

This paper constructs and applies a corrected Rural Tourism Development Index (RTDI) to all 12 Goa talukas using FY 2023-24 official data. The RTDI is a four-dimension composite instrument measuring economic contribution, market diversification, rural orientation, and social inclusion. A specification error in the RTDI rural orientation proxy is identified and corrected, with direct consequences for the policy conclusions that can be drawn from the index. All statistical inferences are treated as indicative rather than definitive given the cross-sectional design and sample size of N= 12.

This study relates to SDG 8 (Decent Work and Economic Growth), SDG 10 (Reduced Inequalities), and SDG 11 (Sustainable Cities and Communities), each of which requires disaggregated subnational evidence to monitor whether tourism growth is inclusive (United Nations, 2015). The paper makes three contributions. First, it provides the first taluka-level multidimensional rural tourism development assessment for Goa. Second, it demonstrates through Kendall tau rank concordance analysis that equal-weight and rural-priority RTDI rankings are statistically uncorrelated, establishing that any composite index for Goa's tourism economy requires explicit weight justification. Third, PCA confirms a single dominant coastal-rural development axis (66.0% of inter-taluka variance), providing a parsimonious empirical basis for spatial policy design.

2. Literature review

2.1. Rural tourism and inclusive development in the global south

The analytical case for tourism as a rural development instrument rests on income multiplier theory and supply-chain linkage models (Sinclair, 1998; Ashley & Roe, 2002). Community-based tourism frameworks emphasise local ownership of tourism assets, participatory governance, and equitable benefit distribution (Scheyvens, 1999; Zapata et al., 2011). Richards (2021) argues that experience-oriented tourism anchored in local cultural production distributes value more broadly than infrastructure-intensive resort models.

Empirical evaluations are more qualified. Zhao and Ritchie (2007) find that pro-poor tourism benefits disproportionately accrue to relatively asset-rich rural households. Chok et al. (2007) identify systematic weaknesses in supply-chain linkage assumptions. Kontogeorgopoulos (2009) documents village-based cultural tourism in Thailand generating income primarily for community elites. For India specifically, Tewari (2008) documents the persistence of geographic concentration in tourism-related economic benefits.

Recent systematic reviews confirm that rural tourism research in developing economies remains fragmented and lacks standardised sub-national measurement frameworks. Choudhary et al. (2025) identify this as a priority gap in their hybrid review of 454 studies across developed and developing economies, while Geng et al. (2025) note in their bibliometric analysis that composite indicator approaches to sustainable rural tourism remain underrepresented in the literature, particularly for South and Southeast Asian contexts.

2.2. Composite indicator methodology for tourism development assessment

The OECD Handbook on Constructing Composite Indicators (OECD & JRC, 2008) establishes the methodological standard: min-max normalisation, explicit weight justification, and sensitivity analysis using rank concordance statistics. Saltelli (2007) provides the

foundational framework for composite indicator uncertainty analysis, establishing that sensitivity reporting is essential for policy-relevant composite instruments. Nardo et al. (2005) apply this framework to regional development indices and document cases where rank reversals between weight schemes alter policy recommendations significantly.

Prior rural tourism composite indices, Liang and Bao (2015) for Chinese village destinations and Cordova-Buiza et al. (2025) for community-based rural tourism, share a limitation: rural orientation dimensions rely on binary qualitative classification rather than continuous spatial measurement. The present study addresses this through inverse tourism density derived from Census geographic data.

2.3. Goa's tourism economy: Development trajectory and structural context

Goa's tourism sector grew from 27.88 lakh total arrivals in 2012 to 80.64 lakh in 2019 (calendar year, Goa Department of Tourism, 2019), recovering to 80.83 lakh in FY 2023-24. The accommodation sector grew from 252 hotels at Liberation to 9,005 by FY 2024-25 (ISED-2025). NSDP at current prices grew from Rs. 56,812 crore in FY 2017-18 to Rs. 92,522 crore in FY 2023-24. Female workers' participation rate stands at 21.92% (ISED-2025), significantly below the national rural female LFPR of 30.1% (MoSPI, 2025).

3. Conceptual framework and RTDI specification

3.1. Theoretical basis

The RTDI is grounded in a multi-dimensional development framework treating rural tourism's contribution to local welfare as the product of four analytically distinct components. Economic contribution captures the absolute scale of tourism activity, determining the upper bound of the income multiplier effect. Market diversification captures the degree of internationalisation, associated with higher per-visitor expenditure and reduced seasonal concentration.

These dimensions interact in a sequential and conditional logic rather than operating as independent additive components. The economic dimension sets the absolute scale of tourism activity, which conditions whether diversification and rural orientation are feasible objectives: a taluka with near-zero tourist volumes cannot yet benefit from diversification policy because there is no visitor market to diversify. Diversification in turn determines whether tourism income circulates through domestic rural supply chains. Ashley and Roe's (2002) supply-chain linkage model establishes that internationally oriented tourism is more likely to use imported supply chains (international hotel groups, tour operator packages) than domestically embedded hospitality. Rural orientation captures the spatial precondition for community-based livelihoods: talukas where tourism intensity per unit area is low retain the agricultural and community land use patterns within which rural tourism can supplement rather than

displace existing livelihoods (Scheyvens, 1999). Social inclusion measured here through domestic visitor share as a demand-side proxy for supply-chain embeddedness depends on the combined effect of rural orientation and market structure: rural talukas with domestically oriented visitors are the most likely to generate the locally embedded supply chains that Ashley and Roe (2002) identify as the mechanism through which tourism income reaches rural households.

The prior rural orientation specification (median foreign share minus foreign share) is explicitly rejected. With a state median foreign share of 3.05%, this specification assigns zero rural orientation to any taluka at or above this threshold. Sanguem (742 km^2, 259 tourists per km^2, inland forested terrain) would receive identically zero rural orientation as Bardez (154 km^2, 13,271 tourists per km^2, established beach resort). The corrected proxy, 1/(tourism density + 1), produces continuously graded scores from 1.000 (Sattari) to 0.000 (Tiswadi).

The social inclusion dimension uses domestic tourist share as a first-order proxy rather than a direct measure of income distribution. This is grounded in Ashley and Roe's (2002) finding that domestic tourists are more likely to use locally owned, unorganised sector accommodation and food services than international resort visitors channelled through tour operators. The proxy is explicitly treated as a demand-side indicator of the probability of local supply-chain engagement; it should not be interpreted as a validated measure of actual income distribution or poverty impact. This limitation is acknowledged in the OLS results and Discussion sections. Future refinement should incorporate primary survey data on visitor expenditure by accommodation type and supply source at the taluka level. Three weight schemes are evaluated per OECD and JRC (2008). W1 (Equal): 35% Economic, 25% Diversification, 25% Rural Orientation, 15% Social. W2 (Economic-dominant): 50/20/20/10. W3 (Rural-dominant): 20/15/40/25.

4. Data and methodology

4.1. Data sources

The analysis uses seven official government sources. The core RTDI cross-section draws on FY 2023-24 taluka-level tourist arrivals from DPSE Goa Statistical Handbook 2023-24 (Table 77), verified against GEIF-2024 and ISED-2025 state totals. Taluka area data are from Census of India 2011 District Census Handbook. Socio-economic context indicators use DPSE Goa ISED-2025. The tourism time-series uses *Goa Department of Tourism Tourist Statistics* (calendar year, 2012-2019). National benchmarks use India Tourism Data Compendium 2025. Labour force trends use *MoSPI PLFS Annual Reports 2022-2025*. Policy context uses *Ministry of Tourism Annual Report 2025-26*. Fiscal-year and calendar-year series are maintained separately throughout.

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In Appendix, Table A1 shows descriptive statistics, tourist arrivals and spatial density indicators, 12 Goa talukas, FY 2023-24.

Total tourist arrivals exhibit a CV of 153.6%, with the mean (737,195) nearly twelve times the median (64,340), indicating a highly right-skewed distribution. Tourism density ranges from 168.5 to 34,430 tourists per km^2, spanning more than two orders of magnitude. This variation motivates both the log transformation in the economic dimension and the inverse density formulation in the rural orientation dimension.

5. Results

5.1. Tourism trends and national context

Figure 1 presents the temporal and national context for Goa's tourism economy. Panel (a) shows the calendar-year trajectory: domestic arrivals grew from 23.37 lakh in 2012 to 71.27 lakh in 2019, recovering to 76.69 lakh in FY 2023-24 and 84.32 lakh in FY 2024-25. Panel (b) shows domestic tourists consistently above 85% of total arrivals. Panel (c) shows accommodation growth. Panel (d) benchmarks Goa against top-10 domestic tourist visit states nationally: Uttar Pradesh leads with 647 million DTV, confirming Goa's character as a high-value rather than high-volume destination.

5.2. Spatial distribution across talukas

Figure 2 decomposes FY 2023-24 tourist distribution across the 12 talukas. Bardez, Tiswadi, and Salcete together account for approximately 74% of state total arrivals. The weighted state mean foreign share is 3.06%.

Sanguem records the highest foreign share at 3.58%, but this reflects a small absolute number of foreign visitors (approximately 6,895) among a total arrival base of only 1.92 lakh. This is better described as 'relative diversification in a low-volume context' than as market diversification in the conventional sense: the high foreign share reflects the near-absence of domestic mass tourism in Sanguem rather than the presence of a large international tourism market. This distinction is carried through to the RTDI interpretation in Section 5.3 and the Discussion.

5.3. RTDI results

Under W1, Bardez ranks first (0.584) through its economic score of 1.000, scoring near-zero on rural orientation (0.000). Tiswadi (0.520, rank 2) and Salcete (0.484, rank 3) similarly reflect economic dominance. Sanguem reaches rank 5 (0.458) through its diversification score of 1.000, which reflects relative diversification in a low-volume context. Sattari reaches rank 6 (0.431) through maximum rural orientation (1.000). These three talukas each lead on a different dimension, confirming the multi-dimensional character of rural tourism development (Figures 3, Tables A2-A3 in Appendix).

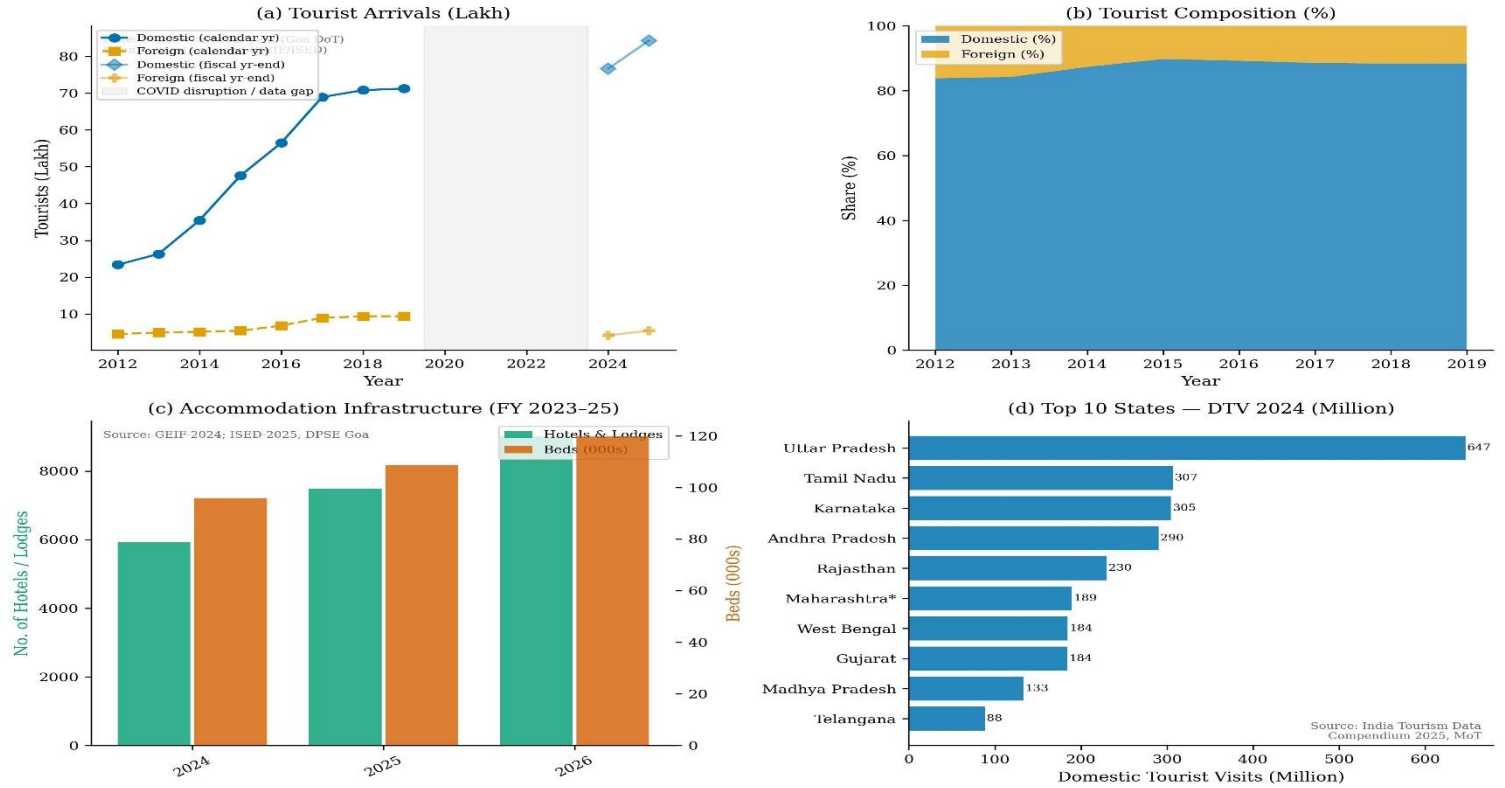

Figure 1. Goa tourism growth trajectory (2012-2025). Sources: (a-b) Goa Department of Tourism (2019); ISED-2025. (c) GEIF-2024; ISED-2025. (d) India Tourism Data Compendium 2025. COVID-19 disruption period shaded. Calendar-year and fiscal-year series maintained separately.

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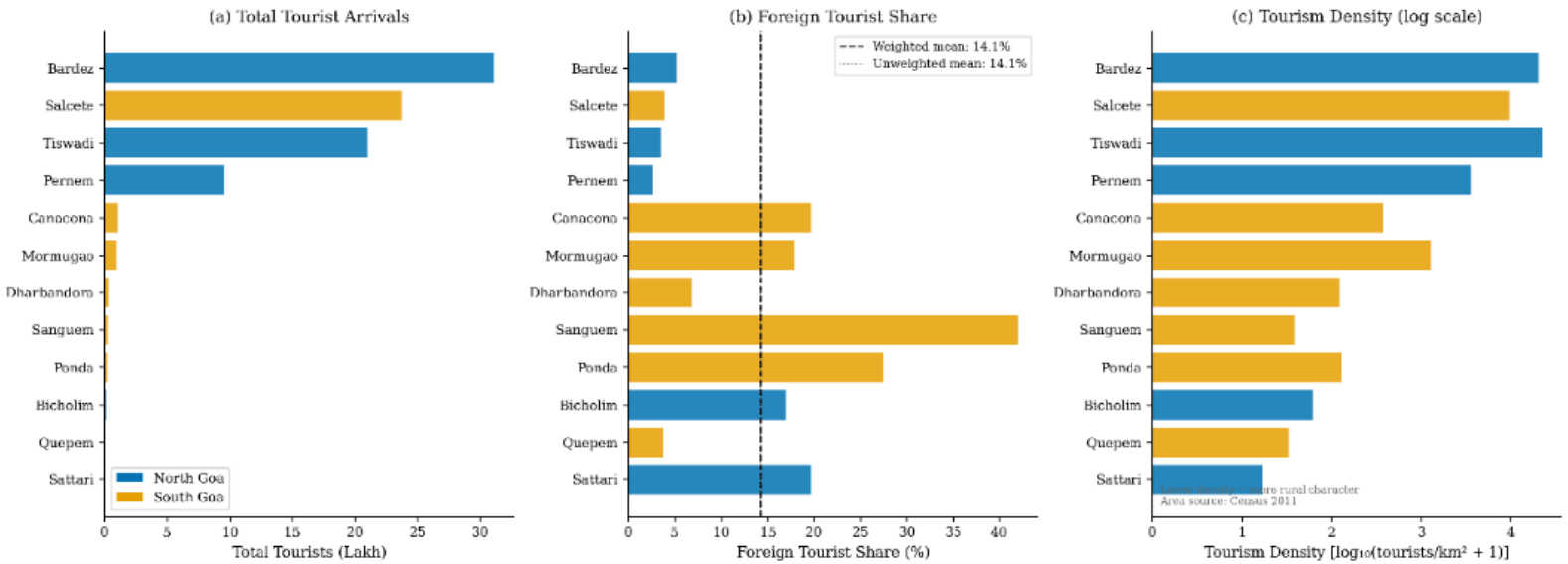

Figure 2. Taluka-wise Tourist Distribution, Goa (FY 2023-24). Source: DPSE Goa, Statistical Handbook 2023-24, Table 77; Census 2011

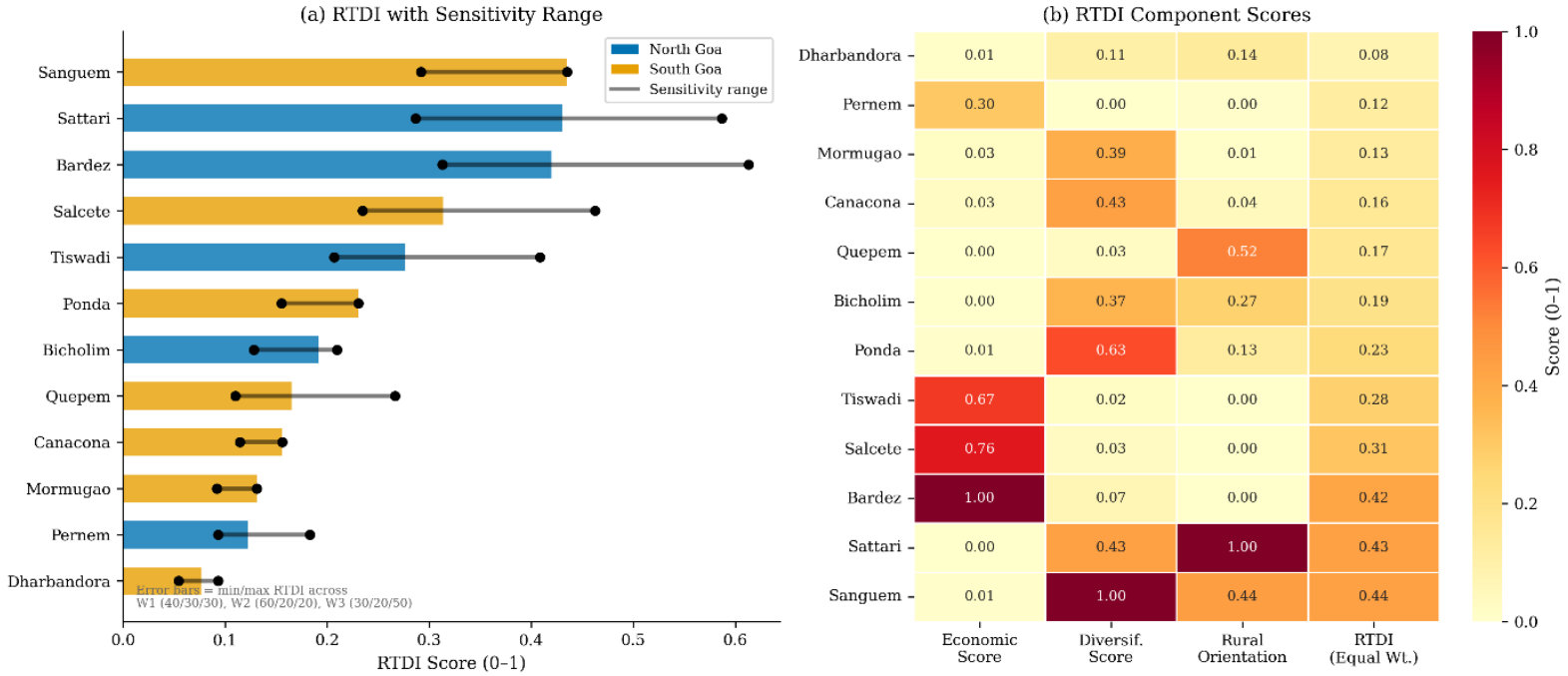

Figure 3. Rural Tourism Development Index (RTDI), Goa talukas, FY 2023-24. (a) RTDI scores with sensitivity range across W1 (35/25/25/15), W2 (50/20/20/10), W3 (20/15/40/25). (b) Component heatmap. Source: DPSE Goa, Statistical Handbook 2023-24.

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Kendall tau between W1 and W2 is 0.727 ($P< 0.001$), indicating strong rank agreement among coastal economic talukas. Kendall tau between W1 and W3 is -0.061 ($P= 0.841$), statistically non-significant and near zero- this is a persistent empirical pattern in this dataset rather than a causal structural claim, and reflects the inverse distribution of economic scores and rural orientation scores across the 12 talukas. Tau between W2 and W3 is -0.273 ($P= 0.250$).

5.4. OLS regression

The following OLS results are treated as indicative patterns rather than definitive inferences, given the cross-sectional sample size of N = 12 talukas. OLS with 12 observations has limited statistical power and degrees of freedom; the estimates should be understood as exploratory descriptive associations that motivate future research with larger samples rather than as confirmatory evidence of causal relationships (Table A4 in Appendix, Figure 4).

Model 1 (RTDI on log tourists): b= 0.040, SE= 0.013, t= 3.18, $P= 0.010$, $R^2= 0.503$, Adjusted $R^2= 0.454$. Shapiro-Wilk $P= 0.225$, Breusch-Pagan $P= 0.668$. Cook's Distance flags Bardez. Model 2 (RTDI on foreign share): b = 0.027, $P= 0.086$, not statistically significant. Model 3: Adjusted $R^2= 0.523$, VIF= 1.09. All models pass diagnostic tests.

The Residuals vs Fitted plot (Figure 4) shows Sattari and Sanguem as positive residuals, the model under-predicts their RTDI scores because their scores are driven by rural orientation and relative diversification, not captured by log tourist volume alone.

5.5. Principal component analysis

PC1 (66.0% of variance) separates coastal economic talukas (Bardez, Salcete, Tiswadi at positive PC1 values) from inland rural talukas (Sattari, Sanguem at negative PC1 values). PC2 (19.4%) separates Sanguem's relative-diversification profile from Sattari's rural-orientation profile. Combined PC1 and PC2 explain 85.4% of inter-taluka variance (Figure 5).

These PCA patterns are specific to Goa's 12-taluka dataset in FY 2023-24. The finding that a single axis accounts for 66.0% of variance documents the empirical structure of this dataset; it should not be generalised to other coastal developing economies without comparative evidence from other contexts.

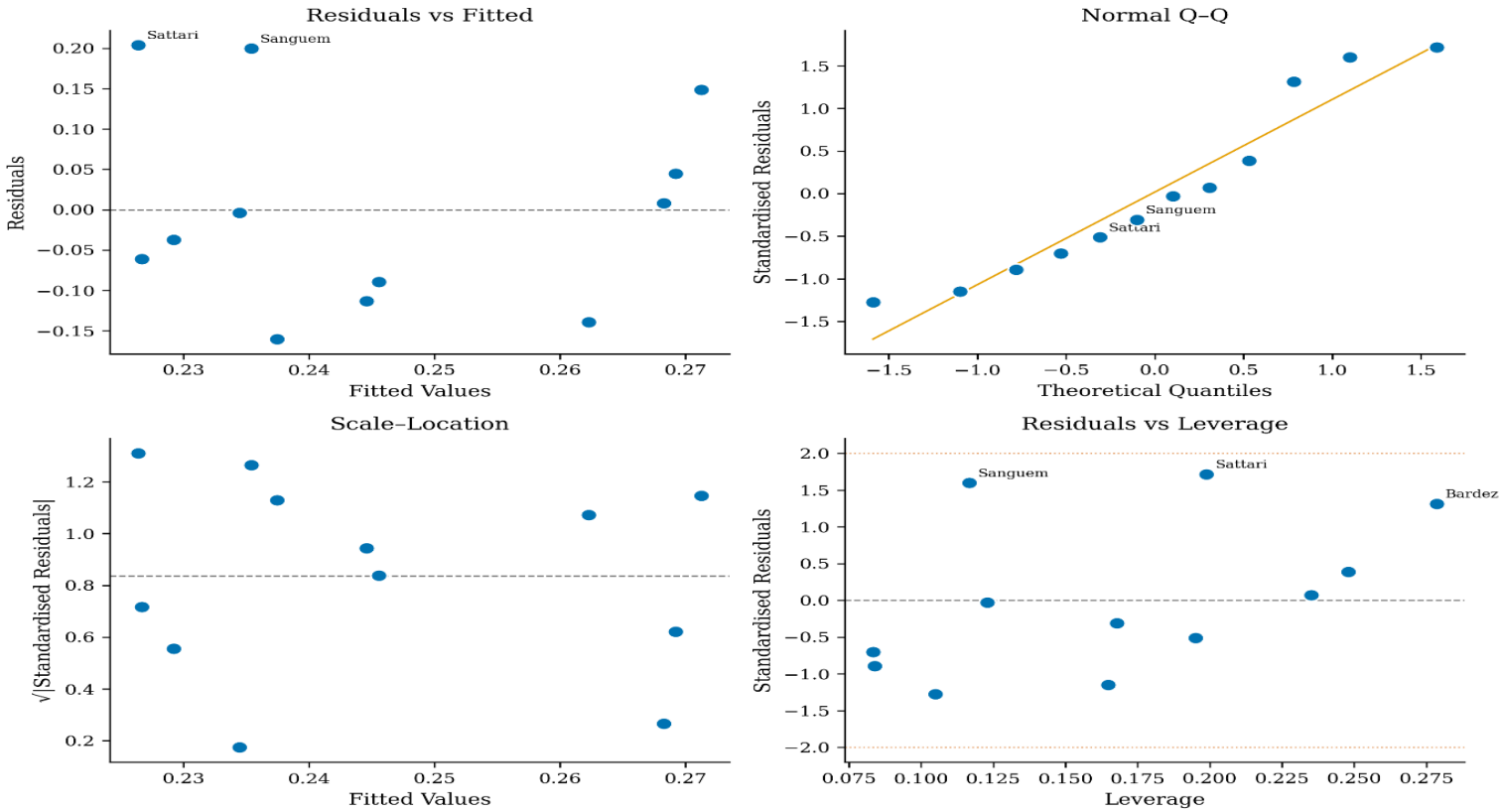

Figure 4. OLS Diagnostic Plots, Model 1. Sattari and Sanguem show highest positive residuals. Bardez is highest-leverage point but below standardised residual threshold.

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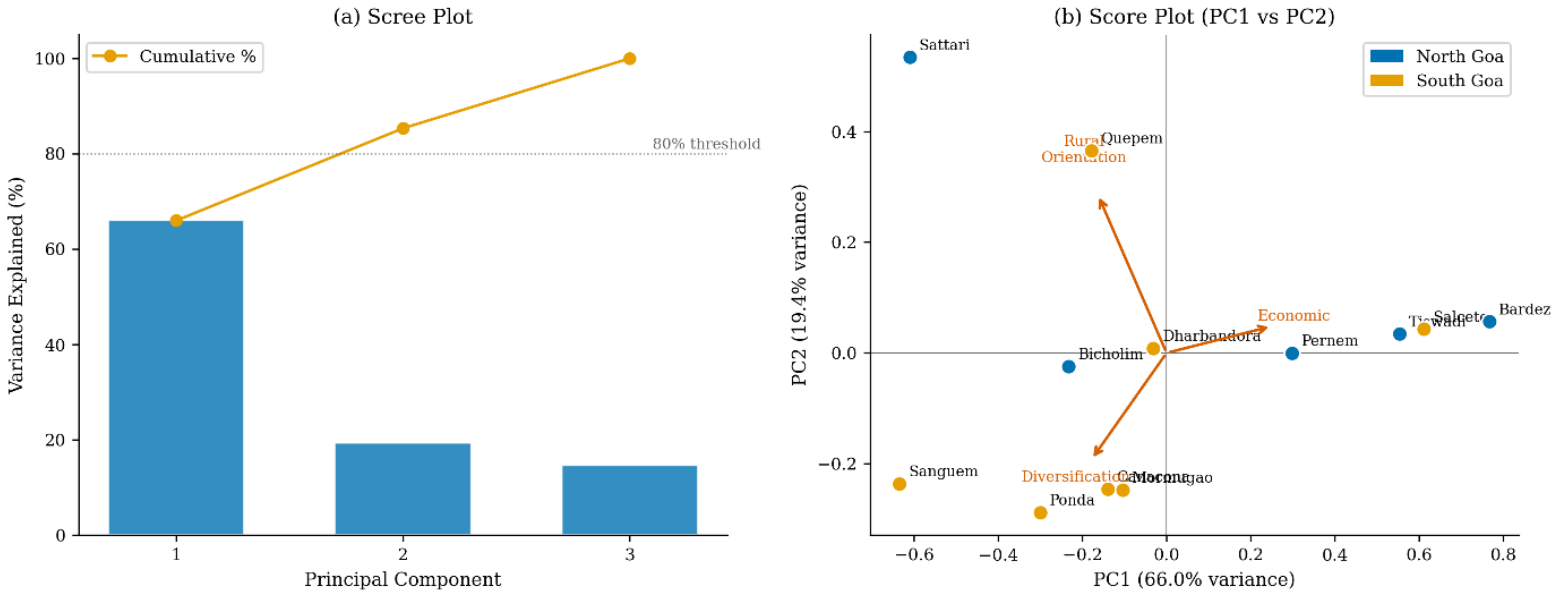

Figure 5. PCA of RTDI Dimensions, Goa talukas, FY 2023-24. PC1= coastal-rural axis (66.0%); PC2= diversification-vs-orientation axis (19.4%). Source: DPSE Goa Statistical Handbook 2023-24 and Census 2011.

6. Discussion

6.1. Empirical patterns and their interpretation

The convergent findings from Kendall tau analysis, OLS regression, and PCA reveal a consistent empirical pattern: Goa's talukas divide into two groups with opposing tourism development profiles. Coastal talukas (Bardez, Tiswadi, Salcete) achieve high RTDI scores through economic volume but score near-zero on rural orientation. Inland talukas (Sattari, Sanguem, Dharbandora, Quepem) show the highest rural orientation and, in the case of Sanguem, the highest relative diversification, but near-zero economic scores.

This inverse distribution of dimension scores is a persistent feature of the Goa dataset, not a causal or theoretically established feature of coastal tourism economies in general. Given the N= 12 cross-sectional design, these patterns are presented as descriptive observations motivating further research rather than as definitive structural conclusions. The Kendall tau of -0.061 between W1 and W3 weight schemes documents that equal-weight and rural-priority rankings are empirically uncorrelated in this dataset, and this observation has direct policy implications for how composite indicators should be designed and communicated.

The OLS finding that log tourist volume explains 50.3% of RTDI variance (R^2= 0.503) confirms that economic scale is the primary predictor of composite scores under the equal-weight scheme, given the 35% weight assigned to the economic dimension. The non-significance of foreign share in Model 2 (*P*= 0.086) suggests that the Sanguem outlier (high relative foreign share in a low-volume context) drives an association that does not hold across all talukas.

6.2. Proxy limitations and measurement validity

The social inclusion proxy (domestic tourist share) is a demand-side indicator of the likelihood of local supply-chain engagement. It does not directly measure income distribution, household poverty impact, or the actual linkage of tourist expenditure to rural producers. A taluka could have a high domestic share but still route spending through urban-owned supply chains. Conversely, a taluka with modest foreign share could generate strong local linkages if accommodation is homestay-based. Acknowledging this limitation, the social inclusion dimension carries the lowest weight in all three OECD-compliant weight schemes (15% in W1, 10% in W2, 25% in W3), reducing its influence on composite rankings while retaining it as a directional signal.

The interpretation of Sanguem's Diversification Score of 1.000 requires particular care. Sanguem's foreign share of 3.58% represents approximately 6,895 foreign visitors among 1.92 lakh total tourists; this is relative diversification in a low-volume context rather than market diversification in the sense of an established internationally oriented tourism economy. Sanguem may attract specialist eco-tourism and

nature-based visitors who constitute a high share of a small market, suggesting niche potential rather than broad international market development. Policy interventions targeted at Sanguem should be calibrated to this niche character rather than assuming conventional international resort development is appropriate.

7. Conclusion and policy implications

This paper has constructed and applied a corrected Rural Tourism Development Index to Goa's 12 talukas using verified official data for FY 2023-24. The analysis reveals a consistent empirical pattern: coastal talukas achieve high RTDI scores through economic volume while scoring near-zero on rural orientation; inland talukas show the reverse profile. The Kendall tau of -0.061 between equal-weight and rural-dominant schemes documents that these two development priorities are inversely distributed in this dataset, requiring an explicit policy weight choice rather than an arbitrary composite.

The correction of the rural orientation proxy, from a median-cutoff specification to an inverse tourism density measure, materially changes the development classification of Sanguem, Quepem, and Bicholim, with direct consequences for which talukas a rural tourism policy framework should target. OLS regression identifies log tourist volume as a significant positive predictor of RTDI (b= 0.040, *P*= 0.010), though these findings are indicative given N= 12. PCA confirms a single dominant coastal-rural axis (PC1, 66.0% of variance).

Five targeted interventions are supported by the empirical patterns. First, Swadesh Darshan 2.0 should establish an inland Goa circuit connecting Sattari (rural orientation rank 1), Sanguem (relative diversification rank 1), and Dharbandora (rural orientation rank 4 under W3). This generates demand pull without requiring prior commercial accommodation investment. Second, the Homestay Policy should differentiate incentive rates for talukas with Economic Scores below 0.05 (Sattari, Quepem, Bicholim, Dharbandora). Third, the Goa Department of Tourism should adopt the RTDI as an annual monitoring instrument using existing Statistical Handbook Table 77 data. Fourth, Sanguem's niche eco-tourism potential warrants a dedicated primary visitor survey before any infrastructure investment is committed, to determine the actual profile, origin, and expenditure patterns of its existing foreign visitors. Fifth, the female workers' participation gap (21.92% versus 30.1% nationally) should be addressed through targeted women's employment programmes in inland domestic tourism circuits.

8. Limitations

Three limitations require explicit acknowledgement. First, the OLS cross-sectional sample size of N= 12 talukas provides limited statistical power and degrees of freedom; the regression coefficients and PCA structure should be treated as descriptive patterns motivating future

research rather than confirmatory causal evidence. Second, the domestic tourist share proxy for social inclusion is a demand-side indicator that does not directly measure income distribution or local supply-chain linkages; it is retained as a directional signal at low weight pending the availability of primary expenditure survey data. Third, the empirical findings are specific to Goa's coastal-hinterland context in FY 2023-24 and cannot be directly extrapolated to other coastal developing economies without comparative evidence; the RTDI framework itself is the transferable element, not the numerical results.

Future research should extend the RTDI framework comparatively across Indian coastal states, viz. Kerala, Maharashtra, Odisha, to assess whether the coastal-inland empirical patterns observed here are generalisable, and should develop primary survey instruments for direct social dimension measurement at the sub-district level.

Conflict of interest

The authors declared no conflicts of interest.

Authors' contributions

All authors contributed to the original idea, study design.

Apurva Sweeten Bandodcar: Conceptualisation; Methodology; Data curation; Formal analysis; Writing - original draft (Percentage contribution 35%)

Jyoti Sunil Naik: Conceptualisation; Methodology; Data curation; Formal analysis; Editing the original draft; Project administration (Percentage contribution 35%)

Filipe Rodrigues e Melo: Research Guide / Supervisor, Conceptualisation; Methodology; Writing- review and editing; Supervision (Percentage contribution 30%).

Ethical considerations

The authors have completely considered ethical issues, including informed consent, plagiarism, data fabrication, misconduct, and/or falsification, double publication and/or redundancy, submission, etc. This article was not authored by artificial intelligence.

Python code for data extraction and analysis was developed with assistance from AI writing and coding tools. All analytical decisions, interpretations, and manuscript content are the intellectual work of the named authors.

Data availability

The dataset generated and analyzed during the current study is available from the corresponding author on reasonable request.

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Appendix

Table A1. Descriptive statistics: tourist arrivals and spatial density indicators, 12 Goa talukas, FY 2023-24

Variable	N	Mean	Std Dev	Min	Median	Max	CV (%)
Domestic tourists	12	702,654	1,084,507	6,745	54,807	2,951,148	154.3
Foreign tourists	12	34,541	49,737	332	14,093	161,650	144.0
Total tourists	12	737,195	1,132,442	8,403	64,340	3,112,798	153.6
Foreign share (%)	12	3.06	1.65	1.39	2.84	6.31	54.0
Area (km^2)	12	279.5	186.9	72	256.5	742	66.9
Tourism density (tourists/km^2)	12	6,375	10,283	168.5	1,418	34,430	161.3

Note. CV = coefficient of variation. Source: DPSE Goa, Statistical Handbook 2023-24, Table 77 (DPSE Goa, 2024b); Census of India 2011 District Census Handbook.

Table A2. RTDI component scores and composite index rankings by taluka, FY 2023-24 (N= 12 talukas)

Taluka	District	Eco score	Div score	Rural Or.	W1 (equal)	W2 (eco)	W3 (rural)	W1 rank
Bardez	North Goa	1.000	0.066	0.000	0.584	0.683	0.371	1
Tiswadi	North Goa	0.673	0.024	0.000	0.520	0.611	0.394	2
Salcete	South Goa	0.760	0.031	0.001	0.484	0.562	0.402	3
Pernem	North Goa	0.304	0.000	0.004	0.469	0.496	0.302	4
Sanguem	South Goa	0.006	1.000	0.442	0.458	0.419	0.523	5
Sattari	North Goa	0.000	0.435	1.000	0.431	0.344	0.668	6
Ponda	South Goa	0.005	0.632	0.131	0.410	0.454	0.364	7
Mormugao	South Goa	0.027	0.389	0.012	0.410	0.465	0.381	8

Taluka	District	Eco score	Div score	Rural Or.	W1 (equal)	W2 (eco)	W3 (rural)	W1 rank
Canacona	South Goa	0.031	0.434	0.045	0.400	0.413	0.409	9
Dharbandora	South Goa	0.009	0.108	0.137	0.370	0.286	0.469	10
Bicholim	North Goa	0.001	0.365	0.272	0.350	0.353	0.350	11
Quepem	South Goa	0.000	0.030	0.521	0.334	0.316	0.382	12

Note. W1 = Equal (35/25/25/15); W2 = Economic-dominant (50/20/20/10); W3 = Rural-dominant (20/15/40/25). Source: DPSE Goa, Statistical Handbook 2023-24.

Table A3. RTDI rank sensitivity analysis across three weight schemes

Taluka	District	W1 equal (35/25/25/15)	W2 eco-dominant (50/20/20/10)	W3 rural-dominant (20/15/40/25)
Bardez	North Goa	1	1	3
Tiswadi	North Goa	2	2	7
Salcete	South Goa	3	3	5
Pernem	North Goa	4	4	10
Sanguem	South Goa	5	5	2
Sattari	North Goa	6	9	1
Ponda	South Goa	7	6	8
Mormugao	South Goa	8	7	6
Canacona	South Goa	9	8	9
Dharbandora	South Goa	10	12	4
Bicholim	North Goa	11	10	11
Quepem	South Goa	12	11	12

Note. Kendall tau: W1-W2 = 0.727 (P<0.001); W1-W3 = -0.061 (P=0.841); W2-W3 = -0.273 (P=0.250).

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Table A4. OLS regression results: RTDI (W1 equal-weight) as dependent variable (N= 12 talukas)

Variable	Model 1	Model 2	Model 3
Constant	-0.087 (0.165)	0.346*** (0.050)	-0.073 (0.154)
log (total tourists)	0.040* (0.013)	--	0.034* (0.012)
Foreign share (%)	--	0.027 (0.014)	0.018 (0.011)
R-squared	0.503	0.266	0.610
Adjusted R-squared	0.454	0.193	0.523
F-statistic	10.13*	3.62 (ns)	7.03*
N	12	12	12
Shapiro-Wilk p	0.225 [Pass]	0.390 [Pass]	0.684 [Pass]
Breusch-Pagan p	0.668 [Pass]	0.237 [Pass]	0.177 [Pass]
VIF (max)	--	--	1.09
Cook's D > 4/N	Bardez	Bardez, Pernem	Sattari

Note. * $P<0.05$; ** $P<0.01$; *** $P<0.001$; ns = not significant. N = 12; findings are indicative given sample size. Full OLS diagnostic plots: Supplementary Figure S1.

References

Ashley C, Roe D. (2002). "Making tourism work for the poor: Strategies and challenges in southern Africa". *Development Southern Africa*. 19(1): 61-82. 61-82. https://doi.org/10.1080/03768350220123855.

Census of India. (2011). *District Census Handbook: North Goa and South Goa*. New Delhi: Office of the Registrar General, Government of India.

Chok S, Macbeth J, Warren C. (2007). "Tourism as a tool for poverty alleviation: a critical analysis of 'Pro-Poor Tourism' and implications for sustainability". *Current Issues in Tourism*. 10(2): 144-10: 144-165. https://doi.org/10.2167/cit303.

Choudhary V, Datta B, Mukherjee S. (2025). "Rural tourism: a hybrid review and future research agenda". *International Journal of Consumer Studies*. 49(1). https://doi.org/10.1111/ijcs.70006?urlappend=%3Futm_source%3Dresearchgate.net%26utm_medium%3Darticle.

Cordova-Buiza F, Medina-Viruel MJ, Perez-Galvez J. (2025). "Community-based rural tourism: a mapping technique analysis study from 2005 to 2023". *Humanities and Social Sciences Communications*. 12, Article 527. https://doi.org/10.1057/s41599-025-04746-7.

DPSE Goa. (2025). Indicators of Socio-Economic Development 2025 (ISED-2025). Panaji: DPSE Goa.

----------. (2024a). *Goa Economy in Figures 2024 (GEIF-2024)*. Panaji: DPSE Goa. https://dpse.goa.gov.in/Goa-Economy-in-Figures-2024.pdf.

----------. (2024b). *Statistical Handbook of Goa 2023-24*. Panaji: DPSE Goa. https://www.dpse.goa.gov.in/Statistical-Hand-Book-2023-24.pdf.

Geng Y, Zhao S, Zhang X, Li J, Yan Y, Gao J. (2025). "Bibliometric analysis of sustainable rural tourism". *Humanities and Social Sciences Communications*. 12, Article 788. https://doi.org/10.1057/s41599-025-05213-z.

Goa Department of Tourism. (2019). *Tourist Statistics. Panaji: GoT*. https://www.goatourism.gov.in/wp-content/uploads/2019/09/Tourist-Statistics-1.pdf.

India Tourism Data Compendium. (2025). *New Delhi: Ministry of Tourism*. https://tourism.gov.in/sites/default/files/2025-03/India%20Tourism%20Data%20Compendium%202024_0.pdf.

Kontogeorgopoulos N. (2009). "The role of tourism in elephant welfare in northern Thailand". *Journal of Tourism*. 10(2): 1-19. https://www.pugetsound.edu/sites/default/files/file/8342_Journal%20of%20Tourism%20%282009%29_0.pdf.

Liang ZX, Bao JG. (2015). "Tourism gentrification in Shenzhen, China: causes and socio-spatial consequences". *Tourism Geographies*. 17(3): 461-481. https://doi.org/10.1080/14616688.2014.1000954.

Ministry of Tourism (2025-26). *Annual Report 2025-26. New Delhi: Ministry of Tourism*. https://tourism.gov.in.

MoSPI. (2025). *Periodic Labour Force Survey (PLFS) Annual Report January-December 2025*. New Delhi: MoSPI. https://www.mospi.gov.in.

Nardo M, Saisana M, Saltelli A, Tarantola S. (2005). *Tools for Composite Indicators Building*. EUR 21682 EN, European Commission JRC, Ispra.

OECD. (2014). Tourism and the Creative Economy. Paris: OECD. http://dx.doi.org/10.1787/9789264207875-en

OECD & JRC. (2008). *Handbook on Constructing Composite Indicators: Methodology and User Guide*. Paris: OECD. https://doi.org/10.1787/9789264043466-en.

Richards G. (2021). "Rethinking cultural tourism". *Tourism Management*. 83, 104231.

Saltelli A. (2007). "Composite indicators between analysis and advocacy". *Social*

Indicators Research. 81(1): 65-77. https://doi.org/10.1007/s11205-006-0024-9.

Scheyvens R. (1999). "Ecotourism and the empowerment of local communities". *Tourism Management*. 20(2): 245-249. https://doi.org/10.1016/S0261-5177(98)00069-7.

Sinclair MT. (1998). "Tourism and economic development: a survey". *The Journal of Development Studies*. 34(5): 1-51. https://doi.org/10.1080/00220389808422535.

Tewari M. (2008). "Varieties of global integration: Navigating Institutional legacies and global networks in India's garment industry". *Competition and Change*. 12(1): 49-67. https://doi.org/10.1179/102452907X264520.

United Nations. (2015). *Transforming Our World: The 2030 Agenda for Sustainable Development*. New York: United Nations. A/RES/70/1.

UNWTO. (2021). "UNWTO inclusive recovery guide: Sociocultural impacts of Covid-19, Issue 3: Women in tourism". https://doi.org/10.18111/9789284422616.

Zapata MJ, Hall CM, Lindo P, Vanderschaeghe M. (2011). "Can community-based tourism contribute to development and poverty alleviation? Lessons from Nicaragua". *Current Issues in Tourism*. 14(8): 725-749. https://doi.org/10.1080/13683500.2011.559200.

Zhao W, Ritchie JRB. (2007). "Tourism and poverty alleviation: an integrative research framework". *Current Issues in Tourism*. 10(2-3): 119-143. https://doi.org/10.2167/cit296.0.