Research Article

Community-Based Tourism in Dima Hasao District, Assam: An Empirical Assessment of Economic Opportunities, Tourism Dependence, and Development Challenges

Neekita Daolagupu[1], Dr. Indrajit Dutta[2], Dr Dharma Ram Deka[3], Kuntal Kalita[4], Alice Daulagupu[5]

[1]PhD Scholar, Travel and Tourism Management, The Assam Royal Global University,Email- India, Emaill: neekitadaolagup@gmail.com
[2]Associate Professor and Dean of Travel and Tourism Management, Department Of Travel and Tourism Management , The Assam Royal Global University, India, Email- Idutta@rgu.ac
[3]Associate Professor and HOD of the Department of Geography, Sonapur College (Autonomous) affiliated with Guwahati University, Email: dhrmdeka@gmail.com
[4]PhD Scholar, Travel and Tourism Management, The Assam Royal Global University, India, Email: kkalita2@rgu.ac
[5]Asst. Professor, Sociology, Maibang Degree College affiliated to Assam University (Silchar), India, Email - alicedaulagupu277@gmail.com

Abstract

Community-based tourism (CBT) is increasingly promoted as a strategy for generating local economic benefits; however, empirical evidence from Dima Hasao District, Assam, remains limited. This exploratory cross-sectional study surveyed 43 residents to assess perceived economic opportunities (Q30–Q33), tourism-development barriers (Q37–Q43), and overall perceived challenges (Q44). Data were analysed using ordinal logistic regression, Friedman, Kruskal–Wallis, Wilcoxon, and Spearman correlation tests. A sensitivity analysis was conducted after excluding 17 participants exhibiting uniform response patterns (n = 26). Results indicated strong agreement regarding CBT-related economic opportunities, with 83.7% of respondents selecting Strongly Agree for each opportunity item. Ordinal logistic regression revealed no statistically significant association between tourism-income dependence and perceived economic opportunities ($\chi^2(2) = 0.037$, $p = .982$). Financial constraints ($\rho = .676$) and infrastructure inadequacy ($\rho = .544$) were positively associated with overall perceived challenges. However, only the association with financial constraints remained statistically significant in the sensitivity analysis ($\rho = .514$, $p = .007$). The findings highlight financial and infrastructural barriers as important considerations for CBT development in Dima Hasao. Nevertheless, the small sample size, pronounced ceiling effects, and cross-sectional design limit generalisability and preclude causal interpretation.

Keywords: Community-based tourism, Dima Hasao, tourism dependence, development barriers, ordinal logistic regression.

1. Introduction

The community based tourism (CBT) is viewed in general terms as a tourism that has the involvement of local citizens in its planning, providing and receiving (Okazaki 2008; Tosun 2000). Conceptual integration of such participation with empowerment in economic, psychological, social and political aspects (Scheyvens, 1999) and recent literature revisits the participation–empowerment connection in CBT context (dos Santos et al., 2024; Gutierrez, 2023). CBT is also included in reviews that look at the broader picture of sustainable development and community welfare (Dogra et al., 2022; Hutnaleontina et al., 2022), and bibliometric and conceptual syntheses demonstrate that the theme of sustainability is a primary organizer for the field (Krittayaruangroj et al., 2023; Mtapuri et al., 2022).

CBT's economic, employment, cultural and sustainability aspects are interrelated. Empirical studies have focused on CBT and its impacts on residents' quality of life and support for tourism (Wani et al., 2024), community engagement and perceived benefits in CBT development (Witchayakawin et al., 2024), pro-poor income distribution and community empowerment (Pang et al., 2024), and CBT and empowerment of women (Gu et al., 2024). There are also some other works exploring the sustainability of CBT in rural places (Ngo & Creutz, 2022; Tien et al., 2024), intermediary organizations (Lee et al., 2024), participation of residents in tourism-based social enterprises (Kummitha et al., 2023), the use of tourism resources as tools for educational and community

development (Mir et al., 2024), and the connections between CBT, sustainability and tourist satisfaction (Huruta et al., 2024).

Hill regions of Northeast India are located far from urban centers and seem to be culturally isolated, keeping their natural environment and living culture/crafts together can be a base for developing community based tourism. In these contexts, local communities' ability to participate in planning and management is considered to be critical to benefiting them locally (Okazaki, 2008; Reindrawati, 2023). Studies in developing countries, however, reveal that there are various operational, structural and cultural constraints on community participation in tourism, such as weak coordination, limited information, institutional frameworks that focus decision-making, and the lack of trained personnel and resources (Tosun, 2000), as well as the ongoing challenges in engaging communities in tourism planning (Reindrawati, 2023). Therefore infrastructure gaps, lack of access to finance and institutional fragmentation are potential limitations on rural tourism in the region, though specific to Northeast India there is limited literature that supports this concept.

Dima Hasao is one of the hill districts of Assam, which is rich in the tribal population and in the geographical features (District Administration, Dima Hasao, 2025). The people who responded to this survey were from the Dimasa, Zeme Naga, Kuki, Hrangkhol, Hmar and other communities and resided in 19 villages in five blocks. The district has a natural landscape and cultural legacy which can be used as a basis for community-based tourism (CBT) development (Department of Tourism, Government of Assam, 2026). Self-employment, providing services and doing crafts may provide livelihoods opportunities to tourism. Systematic assessment of community perception is required for planning to be locally grounded as the viability of CBT also needs to be understood by residents' perceptions of tangible benefits and manageable obstacles to adopting CBT (Wani et al., 2024; Witchayakawin et al., 2024).

There are three gaps that motivate this study. First, there is not any empirical evidence, in the literature consulted here, that establishes a perception of the economic opportunities that residents of Dima Hasao have towards CBT. Second, little is known about whether these perceptions vary by level of dependency in the household on tourism income; if there is a differential perception of benefits planning based on an average perception may be misdirected. Third, the district's overall judgement of development barriers has not been described in terms of endorsement of specific barriers and how each barrier is related to the overall judgement of barriers. An exploratory pilot survey might provide clues to the design of larger, more representative surveys and can indicate the areas of community agreement and disagreement to planners and community organisations. Analysis is therefore concerned with the perceived opportunities, differences according to the tourism income dependence and the relative importance of the individual barriers but not with the assumption that perceptions are mirrored in the actual outcomes.

Research objectives:

1. To examine community perceptions of economic opportunities associated with CBT in Dima Hasao
2. To assess whether perceived economic opportunities differ according to respondents' dependence on tourism income
3. To compare perceived barriers to CBT development
4. To investigate associations between specific development barriers and overall perceived challenges

2. Materials and Methods

The study was exploratory, quantitative and cross-sectional survey to understand economic opportunities and problems of community based tourism (CBT) from community perspective in Dima Hasao District, Assam, India. The information given by the researcher indicates that random sampling was used in selecting the respondents and the data was gathered from the respondents using a structured online questionnaire via Google Forms. A total of 43 respondents (in 19 villages) were included in the survey, spread across five administrative blocks, namely, Diyungbra (n = 14), Jatinga Valley (n = 13), New Sangbar (n = 10), Maibang (n = 4) and Harangajao (n = 2). The

target population for this program was the local community and tourism actors over 18 years. There were no other exclusion criteria applied. The questionnaire included data regarding the socioeconomic characteristics, perceived economic opportunities, tourism-income dependence and problems influencing the development of CBT of the respondents. The results were considered exploratory and not taken as indicative of the whole population of Dima Hasao District due to a relatively small population and unequal representation in administrative blocks.

A structured questionnaire was used to gather data, which included demographic and socioeconomic data and 44 items of perception. Block, village, gender, tribal affiliation, marital status, education, occupation, annual income, primary income source and dependence on tourism as the major source of income were the background variables. All perception items were scored on a 5 point Likert scale ranging from 1 (Strongly Agree) to 5 (Strongly Disagree) with a lower score indicating higher levels of agreement. Economic opportunities measure was taken using four indicators: Additional income in the household (Q30); Generating income from the economic activities of the household (Q31); Economic participation of women (Q32); Involvement of youth and their skills development (Q33). Seven of the development barriers were assessed, such as insufficient infrastructure (Q37), lack of professional training (Q38), financial constraints (Q39), limited community participation (Q40), insufficient marketing (Q41), coordination problems with other stakeholders (Q42), and income instability during the seasons (Q43). A global item on perceived obstacles to CBT development (Q44) was used to assess overall perceived challenges to CBT development. Tourism-income dependence was sorted by applying the notion of "not at all", "partially dependent", or "fully dependent". No internal-consistency coefficient were calculated, individual items in the questionnaire were analysed separately.

Data processing included checking the missing items in the 44 questionnaire items (Q1 – Q44), numerical coding and checking the response labels, and checking the distribution of the responses using descriptive statistics. Special focus was placed on the presence of patterns of uniform response and high ceiling effects. 41 (43-2) of the 43 respondents answered all of the 44 perception items and two respondents had a few missing items. But, the data was complete on all the economic-opportunity focal items (Q30 - Q33) and development-challenge items (Q37 - Q44). The results for two different response-pattern indicators were analyzed. One pattern of responses was for 17 respondents (39.5%) to respond Strongly Agree to all of the perception items (Q1–Q44). Second, 31 respondents (72.1%) checked the Strongly Agree answer to all four of the economic-opportunity items (Q30–Q33); that is, they perceived economic opportunities due to CBT to be consistently favourable. These indicators were analyzed independently because it is assumed that if a person agrees with four opportunity items it does not necessarily mean that she agrees with the rest of the questionnaire. Forty-three (43) respondents were kept in the primary statistical analyses. An additional analysis was conducted with the 26 respondents who did not respond to a uniform pattern of Strongly Agree with all perception items answered, to assess the sensitivity of the results to the uniform-response pattern. This sensitivity analysis was performed to determine how sensitive the observed statistical relationships were to, not to "disqualify" the excluded responses as invalid.

IBM SPSS Statistics was used for statistical analyses with two sided significance tests at $\alpha = .05$. Data were summarised using frequencies, percentages, median, mean and standard deviation. A proportional-odds ordinal logistic regression model was used to test the relationship between the tourism-income dependence and the perceived household income opportunities (Q30) with the non-dependence as reference. The likelihood ratio, goodness-of-fit statistics, pseudo-R^2 and parallel-lines test were used for model evaluation. Odds ratios and CI were calculated using regression coefficients. Positive SPSS PLUM location coefficients suggested increased chances of increases in the number of the answers, which represented a decreased level of agreement. Additional specifications were used that included gender and alternative complementary log-log link.

The items in the economic-opportunity category (Q30–Q33) were compared to the items in the development barriers category (Q37–Q43) with the use of Friedman tests. The differences between the groups when they were defined as dependent on tourism were analyzed by Kruskal–Wallis tests with the aid of Pearson chi-square tests. Twenty-one pairwise Wilcoxon signed-rank tests carried out, with Holm correction for multiple comparisons,

evaluated barrier differences. Friedman effect sizes were measured by the Kendall's W. Spearman correlation were used to investigate the association between each barrier and the total challenges (Q44) and adjusted using Holm statistics. Selected regression, Friedman, and correlation analyses were repeated with the uniform-response participants removed from the analyses to perform sensitivity analyses. There was no predictive or machine-learning used.

3. Results

3.1 Data quality and respondent characteristics

Across Q1–Q44, 41 of 43 respondents (95.3%) answered every item. About two-thirds of the respondents (N = 43) completed all items, with none missing on the two items omitted (Q15 and Q16) and another respondent missing one item (Q25); there were no missing data for the focal items (Q30–Q33, Q37–Q44). 17 respondents responded Strongly Agree to each of the items answered (39.5%) and 31 respondents responded Strongly Agree to all four of the items (Q30-33) (72.1%). Ceiling effects were present on all 44 items with the median and mode being 1 (Strongly Agree). The respondents are summarised in Table 1. Most of them were unmarried (55.8 %), male (74.4 %) and the largest tribal community were Dimasa (46.5 %). The maximum percentage of the graduates (37.2%) and Class 12 completers (30.2%) were the educational groups, 53.5% were self-employed and annual income was distributed in three bands. Tourism-income dependence was distributed as not at all (n = 11, 25.6%), partially dependent (n = 20, 46.5%) and fully dependent (n = 12, 27.9%).

Table 1. Demographic and Socioeconomic Characteristics of Survey Respondents (N = 43)

Characteristic	n	%
Block		
Diyungbra	14	32.6
Jatinga Valley	13	30.2
New Sangbar	10	23.3
Maibang	4	9.3
Harangajao	2	4.7
Gender		
Male	32	74.4
Female	11	25.6
Tribe		
Dimasa	20	46.5
Zeme Naga	7	16.3
Kuki	3	7.0
Hrangkhol	2	4.7
Hmar	2	4.7
Other	9	20.9
Marital status		
Unmarried	24	55.8
Married	19	44.2
Educational qualification		
Below Matric	6	14.0

Matric	1	2.3
Below Class 12	2	4.7
Class 12 pass	13	30.2
Graduate	16	37.2
Post-graduate	4	9.3
PhD	1	2.3
Occupation		
Self-employed	23	53.5
Unemployed	7	16.3
Farmer	5	11.6
Private sector	4	9.3
Government service	4	9.3
Annual income (INR)		
Less than 20,000	13	30.2
20,000–50,000	15	34.9
50,000 and above	15	34.9
Main source of income		
Self-employed	24	55.8
Agriculture	9	20.9
Private sector	6	14.0
Government service	4	9.3
Dependence on tourism income		
Not at all	11	25.6
Partially dependent	20	46.5
Fully dependent	12	27.9

Note. Percentages are of 43 respondents and may not sum to 100 because of rounding. Respondents lived in 19 villages.

3.2 Community perceptions of economic opportunities

Respondents were asked about their perception of economic opportunities of community based tourism (CBT) in the first research objective. Table 2 and Figure 1 show that 36 out of 43 respondents (83.7%) answered Strongly Agree to each of four indicators as follows: household income (Q30), employment (Q31), women's economic participation (Q32) and youth involvement and skill building (Q33). There was a combined agreement from 90.7% to 95.3% and mean score ranged from 1.21 to 1.28 reflecting favourable perceptions. All four indicators had a strong agreement (72.1%) from 31 respondents. Across 172 item-level responses, 144 (83.7%) were Strongly Agree, 15 (8.7%) Agree, 11 (6.4%) Neutral, and two (1.2%) Disagree. The results indicate that perceived economic opportunities for CBT are high, but this does not mean that there are proven economic benefits.

Table 2. Descriptive Statistics and Response Distribution for Perceived Economic Opportunities (N = 43)

Item	SA *n* (%)	A *n* (%)	N *n* (%)	D *n* (%)	*M*	*SD*	Mdn
Q30 Household income	36 (83.7)	5 (11.6)	2 (4.7)	0 (0.0)	1.21	0.51	1
Q31 Employment	36 (83.7)	3 (7.0)	4 (9.3)	0 (0.0)	1.26	0.62	1
Q32 Women's participation	36 (83.7)	3 (7.0)	3 (7.0)	1 (2.3)	1.28	0.70	1
Q33 Youth involvement and skills	36 (83.7)	4 (9.3)	2 (4.7)	1 (2.3)	1.26	0.66	1
Pooled (172 responses)	144 (83.7)	15 (8.7)	11 (6.4)	2 (1.2)	–	–	–

Note. SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree. No respondent selected Strongly Disagree. Scores: 1 = Strongly Agree to 5 = Strongly Disagree, so lower means indicate stronger agreement. Mdn = median.

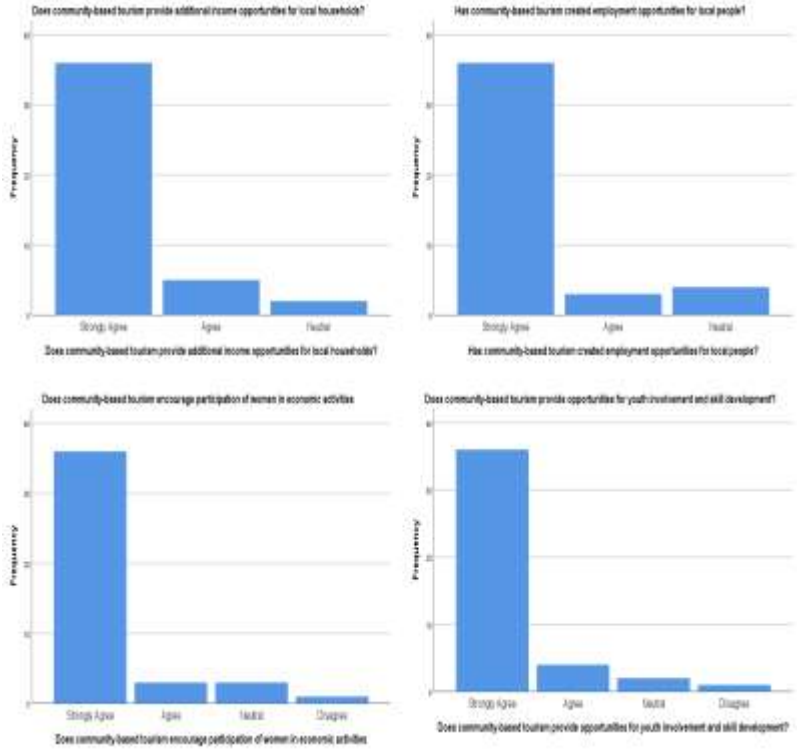


Figure 1. Community Perceptions of Economic Opportunities Associated with Community-Based Tourism

Responses to this question were tallied to make frequency distributions on responses to Q30 (household income, top left), Q31 (employment, top right), Q32 (women's participation, bottom left) and Q33 (youth involvement and skill development, bottom right) (N = 43). One SPSS panel of original charts that present bars of data, with the frequency (0-40) on the y-axis.

3.3 Model 1: Tourism dependence and perceived economic opportunities

ORDINAL LOGISTIC REGRESSION showed that there was no statistically significant difference in tourism-income dependence between perceived household income opportunities (Q30), $\chi^2(2) = 0.037$, p = .982 and the explanatory

power was negligible (Nagelkerke R^2 = .001). No statistically significant difference could be found between those who were fully dependent on tourism-income (OR = 1.000, 95% CI [0.116,8.638], p = 1.000) and those who were partially dependent on tourism-income (OR = 0.853, 95% CI [0.118,6.166], p = .874) compared with the respondents who were not dependent on tourism-income. This result was found to be nonsignificant when a sensitivity analysis was performed on the 26 participants without the 17 uniform-response participants, $\chi^2(2)$ = 1.612, p = .447. Wide confidence intervals, limited number of response categories and small numbers of respondents should be interpreted with caution. These findings show that no association was found and not proving the equivalency of the groups of tourism-dependence.

Table 3. Ordinal Logistic Regression Results for Tourism Dependence and Perceived Household Income Opportunities (Q30)

Parameter	B	SE	Wald	p	OR	95% CI (OR)
A. Full sample (N = 43), parameter estimates						
Threshold: Q30 = Strongly Agree	1.566	0.795	3.877	.049	–	–
Threshold: Q30 = Agree	2.950	0.992	8.846	.003	–	–
Fully dependent vs. not at all	0.000	1.100	0.000	1.000	1.000	[0.116, 8.638]
Partially dependent vs. not at all	−0.160	1.009	0.025	.874	0.853	[0.118, 6.166]
Not at all dependent (reference)	0	–	–	–	–	–
B. Model fit, full sample						
Likelihood-ratio $\chi^2(2)$ = 0.037, p = .982 (−2LL 12.528 → 12.491)						
Pearson $\chi^2(2)$ = 1.321, p = .516 Deviance $\chi^2(2)$ = 1.801, p = .406						
Pseudo-R^2: Cox & Snell = .001 Nagelkerke = .001 McFadden = .001						
Test of parallel lines $\chi^2(2)$ = 1.801, p = .406						
C. Sensitivity sample (n = 26), parameter estimates						
Fully dependent vs. not at all	1.164	1.272	0.838	.360	3.20	[0.27, 38.75]
Partially dependent vs. not at all	−0.348	1.061	0.108	.743	0.71	[0.09, 5.65]
LR $\chi^2(2)$ = 1.612, p = .447 Nagelkerke R^2 = .078 parallel lines $\chi^2(2)$ = 1.529, p = .466						

Note. Logit link; outcome Q30 (three observed categories). OR = exp(B); with the SPSS parameterization, Under the SPSS PLUM logit parameterization, odds ratios greater than 1 indicate higher odds of a higher-numbered response category (weaker agreement), whereas odds ratios below 1 indicate comparatively stronger agreement.

3.4 Model 2: Comparison of perceived economic benefits

The Friedman test indicated no statistically significant differences among the four economic-opportunity indicators (Q30–Q33), $\chi^2(3)$ = 0.284, p = .963, with comparable mean ranks ranging from 2.47 to 2.52 (Table 4). The sensitivity

analysis excluding 17 uniform-response participants (n = 26) produced the same test statistic and significance level. Similarly, Kruskal–Wallis tests revealed no statistically significant differences across tourism-income dependence groups for household income (H = 0.036, p = .982), employment (H = 4.724, p = .094), women's economic participation (H = 0.001, p = 1.000), or youth involvement and skill development (H = 1.340, p = .512). The number of Strongly Agree responses across the four indicators also showed no significant between-group difference (H = 2.068, p = .356). Although employment exhibited the largest test statistic, its association with tourism-income dependence was not statistically significant. These findings suggest broadly favourable perceptions across the surveyed groups, but the nonsignificant results should not be interpreted as evidence of equivalent perceptions.

Table 4. Friedman and Kruskal–Wallis Test Results for Perceived Economic Opportunities

Test / item	Group or sample	Mean rank	Statistic	df	*p*
A. Friedman test, Q30–Q33					
Full sample (N = 43)	Q30 / Q31 / Q32 / Q33	2.47 / 2.52 / 2.50 / 2.51	$\chi^2 = 0.284$	3	.963
Sensitivity (n = 26)	Q30 / Q31 / Q32 / Q33	2.44 / 2.54 / 2.50 / 2.52	$\chi^2 = 0.284$	3	.963
B. Kruskal–Wallis tests by tourism dependence (N = 43)					
Q30 Household income	Not at all / Partial / Full	22.23 / 21.75 / 22.21	*H* = 0.036	2	.982
Q31 Employment	Not at all / Partial / Full	26.23 / 19.65 / 22.04	*H* = 4.724	2	.094
Q32 Women's participation	Not at all / Partial / Full	22.05 / 21.98 / 22.00	*H* = 0.001	2	1.000
Q33 Youth involvement	Not at all / Partial / Full	24.23 / 20.73 / 22.08	*H* = 1.340	2	.512
Strongly Agree count, Q30–Q33	Not at all / Partial / Full	18.41 / 23.73 / 22.42	*H* = 2.068	2	.356

Note. Groups: Not at all = not at all dependent on tourism income (n = 11); Partial = partially dependent (n = 20); Full = fully dependent (n = 12). The Strongly Agree count ranges from 0 to 4 (M = 3.35, SD = 1.23, median = 4).

3.5 Model 3: Perceived barriers to community-based tourism development

Seven perceived barriers to community based tourism development (Q37-43) were examined under the third research objective. A median and mode value of 1 (Strongly Agree) was found for all the barriers as shown in Tables 5A and 5B and Figure 2. The highest percentage of Strongly Agree responses were for item Q38: lack of training and professional skills (88.4%) followed by limited community participation (Q40; 81.4%), coordination problems (Q42; 81.4%), seasonal income instability (Q43; 79.1%) and inadequate marketing (Q41; 76.7%). 67.4% strongly agreed that infrastructure inadequacy (Q37) and financial constraints (Q39) were problems. But, 18.6% disagreed and strongly disagreed with infrastructure, versus 14.0% with financial constraints. 60.5% of the respondents strongly agreed with and 25.6% strongly disagreed on the overall challenge item (Q44). For all subjects, statistically significant differences were found between the seven barriers by the Friedman test ($\chi^2(6) = 16.875$, p = .010), although there was a small effect size (Kendall's W = .0654). The results of the sensitivity analysis (n = 26) were identical with the same test statistic and significance level and an increase in Kendall's W to .1082. The results showed differences in the relative perceptions of the barriers to development by the respondents

although the overall effect sizes were small.

Table 5A. ***Descriptive Statistics and Friedman Mean Ranks for the Full Sample (N = 43) and Sensitivity Sample (n = 26)***

Variable	Development barrier	Mean ± SD (N = 43)	Mean rank (N = 43)	Mean rank (n = 26)
Q37	Inadequate infrastructure	1.8837 ± 1.48339	4.40	4.65
Q38	Lack of training and professional skills	1.1628 ± 0.48453	3.59	3.33
Q39	Limited financial support or credit	1.6977 ± 1.24470	4.35	4.58
Q40	Low community participation	1.2791 ± 0.66639	3.86	3.77
Q41	Inadequate marketing and promotion	1.3953 ± 0.84908	4.20	4.33
Q42	Coordination issues among stakeholders	1.2558 ± 0.58117	3.80	3.67
Q43	Seasonal tourism and income instability	1.2326 ± 0.47994	3.80	3.67

Table 5B. Friedman Test Statistics

Statistic	Full sample	Sensitivity sample
Valid observations (N)	43	26
Number of variables (k)	7	7
Chi-square (χ^2)	16.875	16.875
Degrees of freedom (df)	6	6
Asymptotic significance (p)	.010	.010
Kendall's W	.0654	.1082
Statistical significance ($\alpha = .05$)	Significant	Significant
Effect size	Small	Small

Note. Responses were measured using a five-point Likert scale: 1 = Strongly Agree, 2 = Agree, 3 = Neutral, 4 = Disagree, and 5 = Strongly Disagree. Lower mean scores indicate stronger agreement with the barrier. The sensitivity sample excludes 17 uniform-response participants. Kendall's W was calculated as $W = \chi^2/[N(k - 1)]$, where N represents the number of respondents and k represents the number of barriers (k = 7).

The Friedman test showed that the differences between the various indicators (Q37–Q43) in terms of assessment of the development barriers of community-based tourism were statistically significant $\chi^2(6, N = 43) = 16.875$, $p = .010$. The small effect size ($W = .0654$) suggested by Kendall's coefficient of concordance, however, indicated a small effect size. The highest mean ranks were for the factors of inadequate infrastructure (4.40) and limited access to financial support (4.35) indicating relatively low agreement with these barriers. Lack of training and professional skills had the least mean rank (3.59), which meant that there was relatively higher agreement. The

differences were statistically significant overall ($\chi^2[6] = 16.875$; $p = .010$; Kendall's $W = .1082$) when 17 uniform-response participants ($n = 26$) were excluded from the sensitivity analysis. However, none of the 21 pairwise Wilcoxon signed rank tests with Holm correction were significant indicating that differences between barriers could not be conclusively demonstrated.

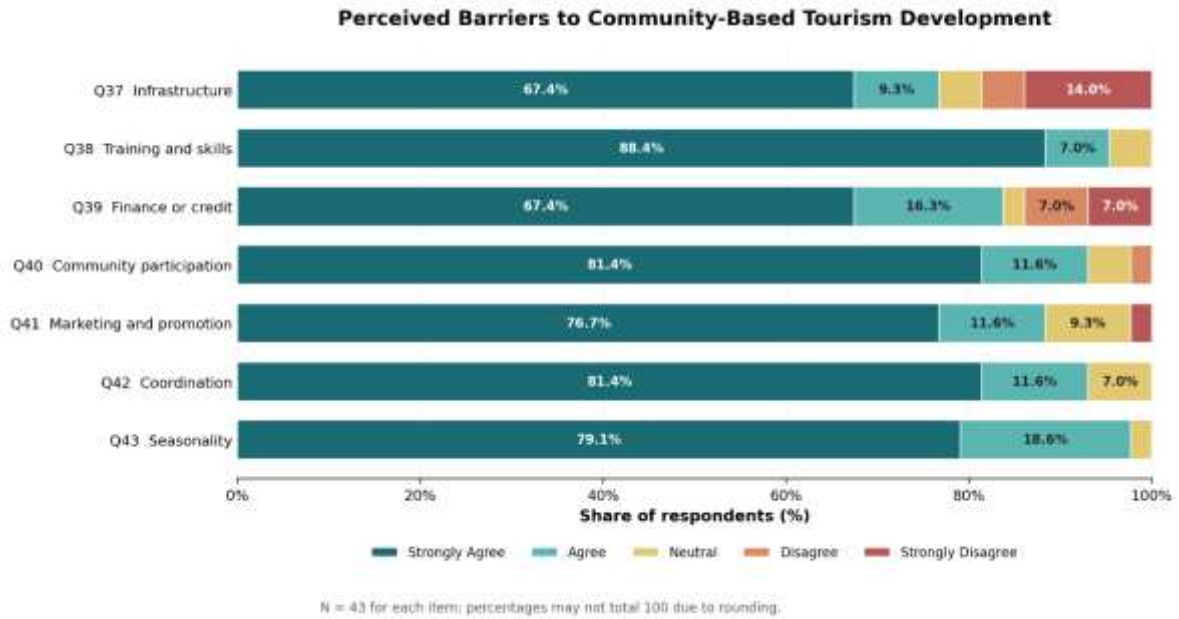


Figure 2. Distribution of Community Responses Across Seven Tourism-Development Barriers

Perceived barriers (Q37 – Q43) to the project, where 43 respondents answered the questions. The responses are on a scale from Strongly Agree to Strongly Disagree. 100% of those who responded are shown in each horizontal bar.

3.6 Post-hoc comparisons of development barriers

Following the significant Friedman test, 21 pairwise Wilcoxon signed-rank comparisons were conducted among the seven development barriers (Table 6). Nine comparisons yielded unadjusted p-values below .05, including infrastructure versus training ($p = .004$) and finance versus training ($p = .005$). However, none remained statistically significant after Holm adjustment for multiple comparisons; the smallest adjusted p-values were .084 and .100, respectively. The substantial number of tied responses (26–39 per comparison) further limited the information available for detecting differences. Therefore, although the Friedman test indicated an overall difference among barriers, no individual pairwise difference was statistically significant after correction.

Table 6. Holm-Adjusted Wilcoxon Signed-Rank Comparisons of Development Barriers

Comparison	Neg.	Pos.	Ties	*Z*	*p* (unadj.)	*p* (Holm)
Q37 Infrastructure – Q38 Training	10	0	33	−2.850	.004	.084
Q37 Infrastructure – Q39 Finance	6	5	32	−.943	.345	1.000
Q37 Infrastructure – Q40 Participation	10	4	29	−2.355	.019	.323

Q37 Infrastructure – Q41 Marketing	10	7	26	−1.844	.065	.715
Q37 Infrastructure – Q42 Coordination	11	3	29	−2.460	.014	.266
Q37 Infrastructure – Q43 Seasonality	11	5	27	−2.401	.016	.288
Q38 Training – Q39 Finance	1	11	31	−2.812	.005	.100
Q38 Training – Q40 Participation	2	5	36	−1.406	.160	1.000
Q38 Training – Q41 Marketing	1	8	34	−2.332	.020	.323
Q38 Training – Q42 Coordination	3	5	35	−1.100	.271	1.000
Q38 Training – Q43 Seasonality	3	6	34	−1.000	.317	1.000
Q39 Finance – Q40 Participation	9	3	31	−1.992	.046	.598
Q39 Finance – Q41 Marketing	7	6	30	−1.246	.213	1.000
Q39 Finance – Q42 Coordination	10	3	30	−2.101	.036	.504
Q39 Finance – Q43 Seasonality	11	4	28	−2.236	.025	.375
Q40 Participation – Q41 Marketing	1	6	36	−1.890	.059	.708
Q40 Participation – Q42 Coordination	4	4	35	−.302	.763	1.000
Q40 Participation – Q43 Seasonality	5	3	35	−.707	.480	1.000
Q41 Marketing – Q42 Coordination	7	3	33	−1.261	.207	1.000
Q41 Marketing – Q43 Seasonality	8	3	32	−1.706	.088	.880
Q42 Coordination – Q43 Seasonality	2	2	39	−.378	.705	1.000

Note. Neg./Pos./Ties = number of respondents whose score on the second item in the pair was lower than, higher than, or equal to the first. Lower scores indicate stronger agreement, so negative ranks indicate stronger agreement with the second item. Z and unadjusted p are SPSS asymptotic two-tailed values. Holm-adjusted p-values were calculated from the unadjusted values across 21 comparisons and capped at 1.000. Nine comparisons had unadjusted $p < .05$; none remained significant after adjustment.

3.7 Associations between specific barriers and overall development challenges

The fourth research objective looked at associations between seven development barriers (Q37–Q43) and the overall challenges (Q44) to tourism development. Significant positive correlation was found for financial constraints (Q39; $\rho = .676$, $p < .001$) and infrastructure inadequacy (Q37; $\rho = .544$, $p < .001$) using Spearman correlation analysis ($N = 43$) and both were significant after the Holm adjustment at an adjusted $p < .007$ (Table 7 and Figure 3). There was a positive association ($\rho = .304$, $p = .048$) with lack of training (Q38) that was not significant after adjustment (adjusted $p = .240$). There was no significant association between marketing, community participation, coordination and seasonality and overall challenges. The other two factors, financial constraints and infrastructure inadequacy were also positively correlated ($\rho = .568$, $p < .001$). This suggests that the more people feel financial and infrastructural constraints are a concern, the more they feel that the other aspects of development were a concern as well. But cross sectional design does not allow causal relationships to be laid.

Table 7. Spearman Rank Correlations Between Perceived Barriers and Overall Tourism-Development Challenges (N = 43)

Comparison	Neg.	Pos.	Ties	*Z*	*p* (unadj.)	*p* (Holm)
Q37 Infrastructure – Q38 Training	10	0	33	−2.850	.004	.084
Q37 Infrastructure – Q39 Finance	6	5	32	−.943	.345	1.000
Q37 Infrastructure – Q40 Participation	10	4	29	−2.355	.019	.323
Q37 Infrastructure – Q41 Marketing	10	7	26	−1.844	.065	.715
Q37 Infrastructure – Q42 Coordination	11	3	29	−2.460	.014	.266
Q37 Infrastructure – Q43 Seasonality	11	5	27	−2.401	.016	.288
Q38 Training – Q39 Finance	1	11	31	−2.812	.005	.100
Q38 Training – Q40 Participation	2	5	36	−1.406	.160	1.000
Q38 Training – Q41 Marketing	1	8	34	−2.332	.020	.323
Q38 Training – Q42 Coordination	3	5	35	−1.100	.271	1.000
Q38 Training – Q43 Seasonality	3	6	34	−1.000	.317	1.000
Q39 Finance – Q40 Participation	9	3	31	−1.992	.046	.598
Q39 Finance – Q41 Marketing	7	6	30	−1.246	.213	1.000
Q39 Finance – Q42 Coordination	10	3	30	−2.101	.036	.504
Q39 Finance – Q43 Seasonality	11	4	28	−2.236	.025	.375
Q40 Participation – Q41 Marketing	1	6	36	−1.890	.059	.708
Q40 Participation – Q42 Coordination	4	4	35	−.302	.763	1.000
Q40 Participation – Q43 Seasonality	5	3	35	−.707	.480	1.000
Q41 Marketing – Q42 Coordination	7	3	33	−1.261	.207	1.000
Q41 Marketing – Q43 Seasonality	8	3	32	−1.706	.088	.880
Q42 Coordination – Q43 Seasonality	2	2	39	−.378	.705	1.000

Note. Spearman's ρ represents the rank correlation coefficient between each development barrier (Q37–Q43) and overall perceived tourism-development challenges (Q44). All correlations were calculated using 43 respondents. Reported p-values are two-tailed, and Holm adjustment was applied across seven correlations to account for multiple testing. Positive coefficients indicate that stronger agreement with a specific barrier is associated with stronger agreement that existing challenges hinder CBT development.

The full-sample Friedman test also showed that there were statistically significant differences among the seven development barriers, $\chi^2(6, N = 43) = 16.875$, $p = .010$, and with a small effect size (Kendall's W = .0654). When the 17 participants who responded to the question in a uniform manner were dropped, the Friedman chi-square

remained the same, but Kendall's W rose to .1082, representing a somewhat higher relative level of agreement among the remaining participants.

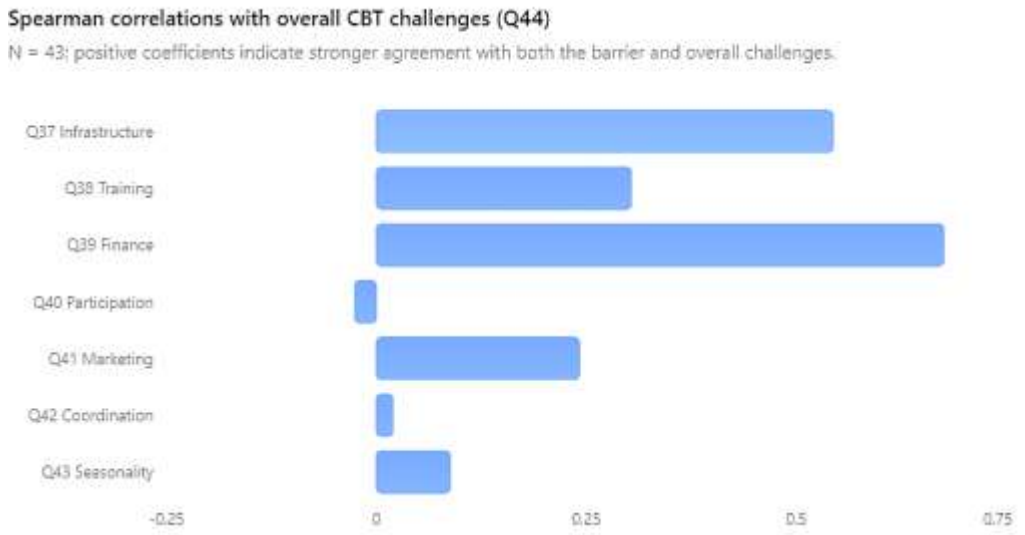


Figure 3. Spearman Rank Correlations Between Perceived Development Barriers and Overall Community-Based Tourism Challenges

Overall correlations (Spearman correlation coefficients, ρ) of seven development barriers with the perceived overall challenges (Q44) by the 43 respondents. After Holm adjustment, infrastructure inadequacy (ρ = .544) and limited access to finance (ρ = .676) were found to have statistically significant positive associations. After adjusting, the other correlations were not statistically significant.

3.8 Sensitivity and robustness analyses

The number of respondents was reduced to 26 for sensitivity analyses because 17 respondents answered Strongly Agree to all the questionnaire items answered. The other respondents were four that were totally dependent, 15 partially dependent and seven non-dependent. The ordinal logistic regression for opportunities provided by household income (Q30) was still not significant, $\chi^2(2) = 1.612$, $p = .447$ and the Friedman test for the four indicators of economic opportunities was not significant, $\chi^2(3) = 0.284$, $p = .963$ (Table 8). The Friedman test for development barriers was still significant ($\chi2(6) = 16.875$, $p = .010$) and Kendall's W was calculated to be .1082, up from .0654. The finance–overall challenges correlation Coefficient dropped from ρ = .676 to .514 with the p value still being significant at .05 level (unadjusted). By contrast, the correlation between infrastructure and overall challenges dropped from .544 to .318 (p = .113); and .568 to .388 (p = .050) between infrastructure and finance. These results show that there are some associations that were sensitive to the exclusion of those who responded to the questions uniformly and, therefore, should be interpreted with caution.

Table 8. Comparison of Full-Sample and Sensitivity Analysis Results

Analysis	Statistic	Full sample (N = 43)	Sensitivity sample (n = 26)
Q30 ordinal logistic regression	LR $\chi^2(2)$	0.037 (p = .982)	1.612 (p = .447)

Friedman test, Q30–Q33	$\chi^2(3)$	0.284 (p = .963)	0.284 (p = .963)
Friedman test, Q37–Q43	$\chi^2(6)$	16.875 (p = .010)	16.875 (p = .010)
Kendall's W, Q37–Q43	W	0.0654	0.1082
Infrastructure (Q37) with Q44	Spearman's ρ	.544 (p < .001)	.318 (p = .113)
Finance (Q39) with Q44	Spearman's ρ	.676 (p < .001)	.514 (p = .007)
Infrastructure with finance (Q37–Q39)	Spearman's ρ	.568 (p < .001)	.388 (p = .050)

Note. The sensitivity sample excludes 17 respondents who answered Strongly Agree to every answered item (4 fully, 15 partially and 7 not-at-all dependent respondents remained). Kendall's *W* for the sensitivity sample was derived from the reported Friedman χ^2 as $\chi^2/[N(k-1)] = 16.875/(26 \times 6)$.

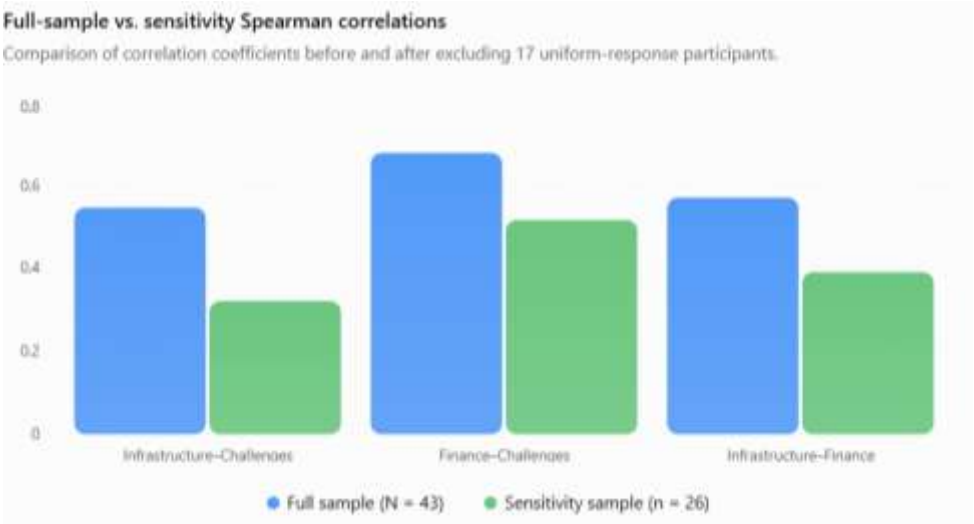


Figure 4. Comparison of Full-Sample and Sensitivity Spearman Correlations

A sensitivity analysis of the associations between development barriers and overall perceived challenges excluded 17 uniform-response participants, which resulted in less attenuation of the associations. The correlation between infrastructure inadequacy (Q37), and overall challenges (Q44) dropped from ρ = .544 (p < .001) for the full sample to ρ = .318 (p = .113) for the sensitivity sample. The association between financial constraints (Q39) and financial overall challenges (Q44) also was found to be declining from ρ = .676 (p < .001) to ρ = .514 (p = .007) but remained statistically significant at the unadjusted .05 level. The infrastructure–finance correlation also decreased from ρ = .568 (p < .001) to ρ = .388 (p = .050). These findings suggest that the relationships observed were responsive to uniformity in responses with the finance–challenges relationship showing relatively stronger uniformity.

3.9 Summary of principal empirical findings

The research outcomes covered all four research questions. First, the perceptions respondents reported about the four economic opportunities of community-based tourism were mostly positive, with 83.7% of the respondents strongly agreeing with each of the indicators. Second, there were no significant differences found in the relationship between tourism-income dependence and perceived economic opportunities using the ordinal logistic regression or Kruskal–Wallis tests. Third, there was a considerable degree of support for all seven development

barriers, especially lack of training and professional skills (88.4% Strongly Agree). The Friedman test showed that there was an overall difference in the barrier ratings (p = .010); however, no individual differences in barrier ratings were significant after Holm adjustment (n = 21). The fourth factor, financial constraints (ρ = .676) and the fifth factor, infrastructure inadequacy (ρ = .544) had a positive association with overall perceived development challenges after multiple-testing correction. The finance–challenges association was significant at the unadjusted level (ρ = .514, p = .007) but the infrastructure–challenges association was not (ρ = .318, p = .113) in the sensitivity analysis. The results of the exploratory studies should be interpreted with caution due to the small sample size, focused patterns of response, and the cross-sectional research design.

4. Discussion

4.1 Economic opportunities associated with community-based tourism

The results reveal that majority of the communities have positive perceptions on the economic opportunities related to community-based tourism (CBT) of Dima Hasao District. For all four indicators (Q30, Q31, Q32, Q33), 83.7% of the respondents chose Strongly Agree, indicating positive perceptions with regard to household income opportunities, employment generation, women's economic participation and youth involvement and skill development. The results align with earlier studies that have shown the perceived benefits and support of communities to tourism (Wani et al., 2024), women empowerment (Gu et al., 2024) and income distribution in community-based tourism (Pang et al., 2024). Friedman test showed that there were no significant differences between the four indicators (p = .963), which means that the response patterns for the four indicators were similar, but does not mean that the indicators are equally important or that they have the same benefits. But there was significant concentration on the responses with 17 respondents (39.5%) choosing Strongly Agree for all the items answered on the questionnaire. This uniformity can be interpreted to represent either general positive feelings, or as a form of acquiescence or as socially desirable responding and the data do not allow for distinguishing between these. The results therefore should be seen as perceived economic opportunities, and not necessarily as realised economic outcomes.

4.2 Tourism-income dependence and economic perceptions

The ordinal logistic regression analysis did not show any significant relationship between these two variables: perceived household income opportunities (Q30) and tourism-income dependence, $\chi^2(2) = 0.037$, p = .982. No statistically significant differences were found between responses of fully dependent (OR = 1.000, p = 1.000) and partially dependent respondents (OR = 0.853, p = .874) compared with respondents who were not dependent on the tourism income. Likewise, no difference was found between the groups of people depending on tourism based on the Kruskal–Wallis test for household income (p = .982), employment generation (p = .094), women's economic participation (p = 1.000) or youth involvement and skill development (p = .512). The lowest p-value was for employment generation and this was not statistically significant. This is in line with the overall positive perceptions that were found throughout the sample. Conclusions are, however, limited by the small number of samples, the focus of the responses and the approximation of the regression results. As the differences between the tourism-income dependence groups are not statistically significant, this should not be interpreted as an indication that perceptions are the same.

4.3 Relative importance of development barriers

The Friedman test revealed that there were significant differences in perceptions of seven CBT development barriers, $\chi^2(6, N = 43) = 16.875$, p = .010, but that Kendall's W = .0654 reflected weak concordance. Infrastructure (4.40) and financial constraints (4.35) demonstrated relatively lower levels of agreement while training deficiencies (3.59) demonstrated higher levels of agreement. The Friedman statistic was the same without the 17 uniform-response participants, but the value of Kendall's W was higher (.1082). There were 9 significant Wilcoxon comparisons which were not significant following Holm correction. The results suggest that there are connections between developmental problems, but do not show a statistically significant difference between the barriers. The

results are general and reflect the discussion on the barriers and local community involvement in tourism development (Tosun, 2000; Reindrawati, 2023).

4.4 Financial and infrastructural constraints

Spearman correlation analysis showed that there were significant positive correlation between overall perceived tourism-development challenges (Q44) and financial constraints (ρ = .676, p < .001) and infrastructure inadequacy (ρ = .544, p < .001) which were still significant after Holm adjustment. The training deficiencies had a weaker association (ρ = .304, p = .048) and this association was not significant after adjustment (p = .240). After discarding the 17 uniform-response participants, the finance–challenges correlation was still significant at the unadjusted level (ρ = .514, p = .007), but the infrastructure–challenges correlation was not significant (ρ = .318, p = .113). Financial constraints were thus found to be more consistently associated to perceived challenges. But because the study was conducted on a small sample with a cross-sectional design, it is difficult to make causal inferences.

4.5 Implications for community-based tourism development

The results give initial direction for community based tourism (CBT) planning of Dima Hasao. The financial accessibility and infrastructure development should be addressed as they were related to overall perceived challenges. Training and professional skills also consistently came up as issues and could be a good investment for capacity building. Good consensus on the participation and coordination barriers shows the need for inclusive planning in line with Reindrawati (2023). Stakeholder engagement and coordination can be achieved through intermediary organisations or social enterprises in the tourism sector (Kummitha et al., 2023; Lee et al., 2024). However, all these implications are tentative. The cross sectional survey was not designed to measure the effectiveness of the interventions but community perspectives and the results cannot be used to determine whether the interventions proposed would lead to better outcomes in tourism.

4.6 Methodological strengths and limitations

The strengths of this study are the clear reporting of response patterns, use of the appropriate nonparametric methods for analyzing the ordinal data, and sensitivity analyses in which the participants who responded in a uniform manner were excluded. The small number of respondents (N = 43) and unequal representation of administrative blocks, as well as the male gender predominance (74.4%) however limit the generalisability. There is no documentation of the probability-sample procedure, thereby sample representativeness cannot be assessed. In addition, focused responses, large links and/or low levels of response variability can result in less statistical accuracy. However, because the cross-sectional design and the self-reported nature of the study, it is not possible to make causal inferences. There was no reliability test of the questionnaire as well as several statistical tests were applied which made chance findings possible. A smaller number of samples, and of different composition, were also used for the sensitivity analyses. Therefore, the results are preliminary and tentative.

5. Conclusion

The study looked at community perception of avenues for economic development, community based tourism (CBT) dependency on the income generated and challenges of economic development in Dima Hasao District of Assam. Results showed positive attitudes to household income generation, employment prospects, participation of women and skill development of youth. Ordinal Logistic and Kruskal–Wallis tests, however, did not show any significant difference in economic perceptions among the groups of different dependence levels on income from tourism. Multiple development barriers were very much accepted as they are mostly related to lack of professional training, infrastructure and financial constraints. While the Friedman test showed that there were statistically significant differences between the barriers overall (p = .010), no specific comparison was statistically significant after Holm adjustment. Significant relationships were found between overall perceived development challenges and financial constraints (ρ = .676) and infrastructure inadequacy (ρ = .544) by Spearman correlations. The financial association was the only one that was statistically significant at the unadjusted level after exclusion of uniform-response participants. These results indicate that, financial accessibility, infrastructure planning, professional

training and inclusive community participation are all issues that should be taken into account with regard to future CBT development initiatives. However, limitations of the small sample size, lack of documentation for the probability sampling process, focused response patterns, and cross-sectional design limit the extent to which conclusions can be made for generalisability or causal inferences. Future studies should have larger representative samples, validated instruments of measure, and should be conducted longitudinally to investigate the effectiveness of the proposed development strategies to improve community outcomes.

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