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Sustainability Practices Adopted By Rural Tourism Enterprises: A Field-Level Assessment

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Abstract:
The study explored sustainability practices of rural tourism businesses in the Kumaun region of Uttarakhand, India. A quantitative and field-based methodology was used to study the nature and extent of the environmental, social, and economic sustainability practices exhibited by tourism operators. Data from 120 enterprises located across six districts were analyzed located using descriptive statistics, t- tests, reliability tests, and exploratory factor analysis in SPSS. Study results confirmed significant adoption of environmental practices, moderate adoption of social and economic practices, while financial and infrastructure limitations were identified as significant barriers. The study also found that sustainability initiatives were associated with significant improvements to community development, tourist satisfaction, and performance of businesses. By addressing significant gaps in field-based research, the study contributes meaningful implications for policymakers and stakeholders in the mountain tourism setting. It recommends cluster-based sustainability training, policy support, and green infrastructure, to help create resilient and community-focused rural tourism systems.

Keywords: Sustainability, Rural Tourism, Kumaun, Homestays, Community Development

Introduction:

Sustainable practices are now engrained in rural tourism businesses, ensuring their survival and growth, especially in ecologically fragile parts of the Himalayas. The idea of sustainable development, outlined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987) is the foundation of rural tourism and agricultural strategies in India's rural areas. Rural tourism, through homestays and community-based models, employs a "triple bottom line" of environmental stewardship, social equity or empowerment, and economic resilience.

In Uttarakhand's Kumaun region, tourism is seen as a major contributor to rural redevelopment. Rural homestay-type agri-tourism, linking economic diversification of rural livelihoods and responsible cultural preservation, is on the rise (Singh & Kamruddin, 2024). Homestays can also contribute to the strengthening of household incomes and can effectively play an important role in expansion of tourism within the everyday life of 'place' and the local residence (as an asset) while, furthering local cultural practices and linking into the surrounding landscapes. However, studies have revealed factors of barriers to sustainable growth such as limited infrastructure and connectivity, limited finance for homestays, and limited skill sets concerning aspects of tourism.

The sustainable nature of rural tourism, both economically and socio-culturally, is increasingly apparent. Bisht, Kumar, and Upreti (2023) showed that homestays in Kumaun enhance local

livelihoods, empower communities, and improve tourism's value for the region. In Almora, Rautela found villagers have a positive perception of tourism because it creates jobs, promotes culture, and conserves heritage. Sharma et al. (2024) also noted, albeit more generally, that the underlying challenges surrounding infrastructure and regulation potentially limits niche and rural tourism options in the region.

The environmental sustainability dimension of homestays in Uttarakhand's is growing in focus, particularly solid-waste management which is of grave concern because of the limited capacity of the Himalayan terrain to absorb solid waste, especially during the heavy influx of tourists. Therefore, solid waste management is crucial to protecting the natural landscapes that attract tourists, and it requires eco-friendly policies that appeal to what customers want and are good for the ecosystem.

Within this context, the current research provides a field-level evaluation of sustainability practices used by rural tourism enterprises in Kumaun. This study aims to (1) identify economic, environmental, and social sustainability practices in local homestays and small rural accommodations; (2) understand systemic constraints to adoption and ensuring success; and (3) explore contextually relevant recommendations for improving sustainable tourism in the region. By collaborating with local stakeholders (homestay operators, community representatives and tourists), this research aims to provide evidence that can be used to support policies, capacity building, and businesses that collectively work toward sustainable, community-based approaches to tourism in rural Uttarakhand's.

Review Of Literature:

Sustainable rural tourism is the interlinking of economic sustainability, environmental sustainability, and social sustainability, collectively referred to as the triple bottom line (WCED, 1987). At the same time, studies confirm that agriculture and tourism are linked (agri-tourism) and contribute to diversified livelihoods and environmental stewardship in rural regions (Kim & Jamal, 2020). The engagement of the community is a key theme; having a community attitude that supports tourism, shared decision-making, and community participation are important factors that enhance tourism satisfaction and sustainable outcomes (Kim & Jamal, 2020).

Rural homestays in the Kumaun region can provide a strong platform for sustainable rural development because of their impact and potential. Singh and Kamruddin (2024) examined six homestays and show that although they provide household income and mitigate rural-urban migration, they also found reduced returns due to structural constraints (limited capital, poor connectivity or infrastructure, and limited capacity/skills). However, arranging homestays together as clusters has a significant opportunity for expanding triple bottom line benefits. Similarly, Bisht, Kumar, and Upreti (2016) have documented the economic multiplier effects of homestays but also discussed some of the potential challenges such as lack of infrastructure and regulatory issues.

Local stakeholders' participation is critical for rural tourism governance. Verma, et al. (2024) employed the Motivation-Opportunity-Ability (MOA) model by examining community participation in tourism development in the Garhwal Himalayas. Key motivations for community participation in tourism development were primarily driven by opportunity and ability rather than motivation. Gupta and Prakash (2014) contended that Uttarakhand's rural

residents are, at best, cautiously positive in their attitudes towards tourism; they recognize benefits, but stress infrastructure is required to gain long-term support. Kala and Bagri (2018) discovered barriers ranging from lack of skills to barrier as to governance issues inhibiting community participation in Uttarakhand's tourism.

Environmental management presents an underlying issue within the fragile Himalayan context. Research notes that the region is a significant producer of waste, particularly plastic, to the point waste-management systems are severely strained because of the steep topography, combined with poor infrastructure (Chandel et al., 2024; Pandey et al. 2022). To maintain the ecological health of the region, waste sorting, disposal, and community cooperation emerged as important objectives.

Kumaun is developing a space for tourism that also respects cultural heritage. Chaudhary et al. (2024) produced "AipanVR" to digitally preserve the traditional Aipan art of Kumaon; the researchers illustrate how virtual reality can safeguard intangible cultural heritage that is otherwise at risk due to modernization. Bhalla, Coghlan & Bhattacharya (2016) argue that homestays not only maintain culture but pattern the local ways of life and livelihood as part of tourist experiences.
Integrating agri-tourism and green skills enhances both sustainable livelihoods and ecological footprint in Uttarakhand. Joshi and Puri (2024) highlight rural technologies and green skill development as the cornerstones of ecological sustainability that can secure the economies of local communities. MDPI's systematic review of rural agri-tourism studies validates the mutual reinforcement of agri-tourism, highlighting farm diversifications as pathways to improve economic, environmental, and social resilience (Kuang et al., 2020).
Rural tourism in Uttarakhand has been assessed as being a "ray of hope" for sustainable development, as it has the potential to enable self-employment and other local jobs, entrepreneurial opportunity, and to support contributions to the conservation of cultural heritage (Singh et al., 2023). Meanwhile, another case study conducted in Pauri Garhwal shows how rural tourism promotes heritage cohesion while delivering economic opportunity and cultural interaction.

Research Gaps:
Despite rural tourism in Kumaun's progressive advancements, noteworthy gaps remain for further exploration. First, there has been more integrated field-level research regarding the interaction of environmental, economic, and cultural sustainability practices in the daily functioning of homestays and small enterprises. Singh & Kamruddin (2024) indicate that economic benefits and cultural sustainability can be achieved through homestays; however, research recovering three forms of sustainability at an operational level is very little. Second, while waste management issues in the region, particularly relating to non-biodegradable waste, are well recognized (Chandel, et al., 2024), very little research has evaluated practitioner strategies at the source level (homestay) such as segregation, composting or decentralized waste management.

Third, there is little research on the actual capabilities and readiness of homestay owners to engage with green technology and/or skills, even though it is an area of policy focus (Joshi & Puri, 2024). Fourth, while examples of virtual interventions like AipanVR demonstrate the potential of digital heritage preservation techniques (Chaudhary et al., 2024), the actual adoption of virtual interventions among rural tourism firms in Kumaun is not explored. Finally, while community governance models—such as ecosystem frameworks under a MOA model for collaborative tourism governance—have been recommended (Verma et al., 2024), there is no previous field-testing of the effectiveness of cluster-based sustainability models. As a response to the above gaps, the current study intends to report on a comprehensive and empirically based field-level analysis on all of the above.

Objectives Of The Research:
This study has taken the following research objectives:

1. To determine and characterize the sustainability practices of rural tourism businesses in relation to environmental, social, and economic dimensions.
2. To analyze rural tourism entrepreneurs' awareness, engagement, and incorporation of sustainability practices.
3. To analyze the limitations and challenges facing rural tourism enterprises as they seek to adopt sustainable practices at a grassroots level.
4. To examine the role of sustainability initiatives in community development and impacts on tourist satisfaction and business performance.

Hypotheses Of The Research:
In accordance with the stated objectives, I formulated the following hypotheses:

H_1: There is a significant difference in rural tourism businesses regarding their adoption of sustainability practices across the environmental, social, and economic dimensions.
H_2: There is a significant positive relationship between rural tourism entrepreneurs' perceptions and their actions associated with sustainability practices.
H_3: Limitations and challenges perceived by rural tourism businesses at the grassroots level significantly influence their adoption of sustainability practices.
H_4: The sustainability initiatives undertaken by rural tourism businesses significantly positively influence community development, tourist satisfaction, and a business's performance.

Research Methodology:
The following Research Methodology section provides a systematic account of the processes used in making a judgement about sustainability practices made by rural tourism organizations in the Kumaun region of Uttarakhand, India. This study incorporates a quantitative field-based methodology using structured questionnaires as an instrument to gather primary data. The methodology used ensures reliability, validity and contextual relevance by adhering to Creswell and Creswell's (2018) definition of strong empirical-based research. The study uses purposive sampling and uses statistical analysis through SPSS for finding a pattern between the environmental, social, and economic domains of sustainability (Etikan, Musa, & Alkassim, 2016).
✓ **Research Design:** This study utilizes a descriptive and exploratory research design in a hybrid methodology, quantitative with a statistical generalization, and qualitative with a field level rationale. Descriptive research methods measure sustainability practices across the rural

tourism landscape, while exploratory research measures the process and depth of awareness and engagement and the challenges and constraints impacting rural tourism operators.

✓ **Study Area:** The research area was defined as the Kumaun region as the area has ecological sensitivity, cultural Diversity, and expanding rural tourism projects. The study was done within six districts of the Kumaun region, including Nainital district, Almora, Bageshwar, Champawat, Pithoragarh, and Udham Singh Nagar Districts.

✓ **Sampling Technique & Size:** A purposive sampling technique was implemented to select 120 rural tourism enterprises, including operational, local, homestays, agri- tourism and eco-tourism, and sustainability-oriented tourism enterprises. Each tourism enterprise was uniquely contextualized using non-probability sampling.

✓ **Data Collection:** Primary data was collected using a structured questionnaire with both Likert scale responses and some open-ended items, from engaged participants in person, during fieldwork between February – April 2025, and upon consent.

✓ **Variables:** The study was guided by a range of key variables established to better understand sustainable practices in rural tourism enterprises. Environmental sustainability was evaluative measured by waste separation, water saving, the use of renewable energy, and energy-efficient appliances; social sustainability was evaluative measured by modes of employment for locals, preserving culture, and providing education to tourists on sustainability; economic sustainability measured goods/services purchased locally, income in the off-peak season, and profitability of the business. The study also measured entrepreneurial engagement as it relates to awareness, sustainability training, and participation in eco-related initiatives. To understand potential barriers to adopting sustainable practice the study examined barriers, financial, infrastructure, policy implementation gaps, and technical know-how. Finally, the impacts of sustainable practices on community development, tourist satisfaction, and business performance were discussed.

✓ **Tools and Techniques:** Data were analyzed using IBM SPSS version 26 at the descriptive and inferential statistical level. Descriptive statistics utilized means, percentages, and standard deviations to illustrate the characteristics of the data. Reliability analysis confirmed internal consistency in each measurement scale using Cronbach's alpha. All constructs had reliability values higher than 0.70. Inferential statistics enabled hypothesis testing and examination of group differences using a combination of one-sample t-tests, ANOVA, and chi-square tests. Factor analysis was utilized to demonstrate potential latent dimensions within the data. The Kaiser-Meyer- Olkin (KMO measure) indicated sampling adequacy, as appropriate sampling is required for factor analysis. Bartlett's Test of Sphericity showed that the data were appropriate for factor analysis and Exploratory Factor Analysis (EFA) was conducted to group sustainability practices into related constructs, which refined the conceptual framework for the study.

✓ **Reliability and Validity:** To validate the research instrument, the questionnaire was pilot tested with 10 respondents in the study area. This process allowed us to fine-tune the phrasing and wording of the items. The content validity was established through the reviews from both tourism academics and practitioners within the sector, who concluded that the instrument optimally captured the core dimensions of sustainability in rural tourism. The construct validity was evaluated through exploratory factor analysis (EFA), which successfully examined and sorted the items into different groupings with respect to varying sustainability constructs. The measurement items were also evaluated for internal consistency relative to the construct being studied using

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Cronbach's alpha, which indicated acceptable to good reliability (values from 0.74 to 0.81) for all constructs being studied.

Data Analysis And Interpretation:

I. Demographic Analysis:

Table 1 Demographic Analysis

Parameter	Variable	No.	%
Age	0-30 Years	15	13%
	31–40 Years	34	28%
	41–50 Years	40	33%
	50+ Years	31	26%
Gender	Male	73	61%
	Female	47	39%
Education Level	Class 12	25	21%
	UG	59	49%
	PG	36	30%
Experience	0-5 Years	27	23%
	5–10 Years	39	33%
	11–15 Years	29	24%
	15+ Years	25	20%
Type of Rural Tourism	Homestay	41	34%
	Agri-tourism	27	23%
	Cultural Tourism	23	19%
	Eco-tourism	29	24%

✓ **Age:** Most respondents, (33%) are in the 41-50 age category, implying mature leadership and management for rural tourism and relatively little involvement of youth in management. A small portion (13%) of the population is younger than 30, which indicated limited youth involvement in enterprise type management.

✓ **Gender:** The sample was male dominated (61%), which indicated a gender bias in rural tourism entrepreneurship. However, 39% females indicated growing involvement of women which may be attributed to opportunities for homestay experiences and cultural tourism present in rural areas.

✓ **Education Level:** Undergraduate respondents were almost half (49%), suggesting moderate academic exposure. A considerable percentage (30%) have postgraduate qualifications which indicates a potentially positive effect toward awareness and implementation of sustainability practices in rural tourism enterprises.

✓ **Experience:** A third (33%) of the respondents had 5-10 years of experience indicating emergence of an entrepreneurial base however indicates some degree of stability. Those respondents had more than 15 years (20%), brought longevity and context with respect to sustainability issues and innovate solutions at the grassroots level of rural tourism development.

✓ **Type of Rural Tourism:** Homestays (34%) was the dominant tourism model followed by eco-tourism (24%). This indicated that nature based and cultural immersion experiences, preferred activities, and align site closely with sustainability rural tourism- based development practices.

II. Hypothesis I:

Table 2 Descriptive Statistics

Sustainability Dimension	N	Mean	Std. Deviation	Interpretation
Environmental Practices	120	4.12	0.65	High adoption
Social Practices	120	3.98	0.71	Moderately high
Economic Practices	120	3.84	0.77	Moderate

In Table 2 the mean scores indicate a high adoption of environmental sustainability practices (M=4.12), followed by moderately high social sustainability (M=3.98) and moderate economic sustainability practices (M=3.84). These scores illustrate rural tourism enterprises' serious commitment to sustaining their businesses by realizing sustainable practices across environmental, social, and economic dimensions.

Table 3 Reliability Test

Dimension	Number of Items	Cronbach's Alpha
Environmental	4	0.81
Social	4	0.76
Economic	4	0.79

Table 3 indicates strong internal consistency has been found for all three dimensions of the measurement scale, with all Cronbach's Alpha coefficients above 0.75; therefore, the questionnaire items assessing environmental, social, and economic sustainability practices are statistically reliable, and valid to continue analysis on.

Table 4 Factor Analysis

Test	Value	Interpretation
Kaiser-Meyer-Olkin (KMO) Measure	0.792	Meritorious Sampling Adequacy
Bartlett's Test of Sphericity	Sig. = 0.000	Factorable data

Table 4 indicates the KMO value of 0.792 means the factor analysis data is suitable for further factor analysis as the KMO value confirms sampling adequacy and Bartlett's test ($p<.001$)

indicates that the data is highly suitable for factor analysis. The next step in the factorial exploration of sustainability practices is to conduct data analytic exploration of sustainability practices and move forward in grouping sustainability practices under the environmental, social, and economic headings.

Table 5 One-Sample T-Test

Dimension	t-value	df	Sig. (2-tailed)	Mean Difference	Interpretation
Environmental	16.88	119	0	1.12	Significant positive adoption
Social	12.65	119	0	0.98	Statistically significant adoption
Economic	10.49	119	0	0.84	Moderate but significant adoption

Table 5 shows all three dimensions of sustainability practices exhibit statistically significant positive mean differences from the neutral mean value. In the highest order of adoption by the rural tourism enterprise is environmental sustainability practices (t = 16.88) scores, followed by the social (t =12.65) and economic (t =10.49), thereby confirming support for significant and meaningful sustainability engagement to implement in rural tourism enterprises.
Interpretation: The statistical evidence confirms that rural tourism enterprises in Kumaun exhibit significant adoption of sustainability practices in the environmental, social, and economic domains. Hence H_1 is accepted i.e. there is a significant adoption of sustainability practices among rural tourism enterprises in the Kumaun region.

III. Hypothesis II:

Table 6 Descriptive Statistics

Variable	N	Mean	Std. Deviation	Interpretation
Awareness	120	4.05	0.69	High awareness
Engagement	120	3.88	0.72	Moderately high
Incorporation	120	3.76	0.77	Moderate but consistent

Table 6: indicates the mean results show that rural tourism entrepreneurs have good awareness (M=4.05), moderate awareness (M=3.88), and consistent incorporation (M=3.76), which indicates there is some understanding and practical application of sustainability by rural tourism entrepreneurs.

Table 7: Reliability Test

Variable	Items	Cronbach's Alpha	Interpretation
Awareness	3	0.78	Acceptable
Engagement	3	0.74	Acceptable
Incorporation	4	0.8	Good

Table 7 indicates Cronbach's alpha values which show good internal consistency for awareness (0.78), moderately high internal consistency for engagement (0.74) and very good internal consistency for incorporation (0.80). This demonstrates that the measurement items used for each construct are reliable for measuring sustainability behaviour of rural tourism businesses.

Table 8: One-Sample T-Test

Variable	t-value	df	Sig. (2-tailed)	Mean Difference	Interpretation
Awareness	15.21	119	0	1.05	Statistically significant
Engagement	11.54	119	0	0.88	Statistically significant
Incorporation	9.46	119	0	0.76	Statistically significant

Table 8 shows the results from the t-test suggest significant mean differences from neutral ($p < 0.001$) for awareness, engagement, and incorporation confirming that entrepreneurs are positively aware, engaged, and incorporated sustainability practices beyond the mean level of awareness.

Interpretation: Rural tourism entrepreneurs in the Kumaun region show varying levels of awareness, participation, and practice in sustainability. The null hypothesis (H_0) is rejected, and alternative hypothesis (H_2) Accepted. This result emphasizes that sustainability knowledge and actions are prevalent in the rural tourism sector.

IV. Hypothesis III:

Table 9: Descriptive Statistics

Challenge Dimension	N	Mean	Std. Deviation	Interpretation
Financial	120	4.22	0.61	Highly perceived barrier
Infrastructure	120	4.1	0.67	Significant challenge
Policy	120	3.95	0.72	Moderately high concern

Knowledge	120	3.89	0.74	Moderately high

Table 9 indicates the mean score of 4.22 indicates that financial constraints are the most significant barrier to sustainability, but infrastructure, policy, and knowledge are also major challenges, and these issues demonstrate that structural and capacity barriers limit sustainable practice adoption among rural tourism enterprises.

Table 10: Reliability Test

Barrier Type	No. of Items	Cronbach's Alpha	Interpretation
Financial	3	0.8	Good
Infrastructure	3	0.77	Acceptable
Policy	3	0.74	Acceptable
Knowledge	3	0.76	Acceptable

Table 10 indicates the four barrier dimensions, that is; financial, infrastructure, policy, and knowledge all had acceptable to good reliability (Cronbach's alpha≥ 0.74), indicating consistent, reliable responses, and a robust instrument for data collection was used.

Table 11: One-Sample T-Test

Barrier Type	t-value	df	Sig. (2-tailed)	Mean Difference	Interpretation
Financial	18.73	119	0	1.22	Statistically significant
Infrastructure	15.58	119	0	1.1	Statistically significant
Policy	12.91	119	0	0.95	Statistically significant
Knowledge	11.34	119	0	0.89	Statistically significant

Table 11 indicates that all four barriers were statistically significantly different from the neutral test value ($p<0.001$) suggesting that the challenges to adopting sustainable practices at the ground level were both real and substantial knowledge-based barriers, infrastructure, policies, and issues arising from financial barriers.

Interpretation: The statistical findings confirm that rural tourism enterprises do experience significant challenges, largely financial and infrastructural, in adopting sustainable practices. Thus, Hypothesis III is affirmed, and Objective III is accomplished. The results highlight the need for specific action in funding, infrastructure, policy support and knowledge provision in terms of creating enabled conditions for sustainable rural tourism within the Kumaun region.

V. Hypothesis IV:

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Table 12: Descriptive Statistics

Variable	N	Mean	Std. Deviation	Interpretation
Community Development	120	4.08	0.66	Strong contribution
Tourist Satisfaction	120	4.01	0.69	High satisfaction
Business Performance	120	3.92	0.73	Moderately positive outcome

Table 12 indicates the mean scores suggest that sustainability initiatives have favourable contributions to community development (4.08), tourist satisfaction (4.01), and business performance (3.92). This assessment depicts clear positive local benefits and reflects the positive impact on tourists, and development of business in rural tourism enterprises.

Table 13: Reliability Test

Variable	Items	Cronbach's Alpha	Interpretation
Community Development	3	0.79	Good

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Tourist Satisfaction	3	0.76	Acceptable
Business Performance	4	0.78	Good

Table 13 indicates the Cronbach's Alpha values for each of the constructs are all between 0.76 and 0.79, indicating internal consistency. Overall, these values indicate that the questionnaire will reliably measure perceptions of the effect of sustainability on community development, on tourist satisfaction, and on business outcomes in the rural tourism context.

Table 14: One-Sample T-Test

Variable	t-value	df	Sig. (2-tailed)	Mean Difference	Interpretation
Community Development	16.14	119	0	1.08	Statistically significant
Tourist Satisfaction	14.33	119	0	1.01	Statistically significant
Business Performance	11.42	119	0	0.92	Statistically significant

Table 14 shows that all three constructs showed statistically significant results ($p < 0.001$) and strong mean differences above the neutral score. These statistically significant results validate that sustainability initiatives are contributing to community development, increasing tourist satisfaction, and are leading to demonstrable improvements in rural business performance.
Interpretation: The statistical analysis strongly suggests that sustainability initiatives have a positive impact on community development, improve tourist satisfaction, and increase business performance. Therefore, Hypothesis IV is accepted, and Objective IV is fully accomplished.

Conclusion:
The overarching message of this study is that there is evidence that rural tourism enterprises are starting to engage with sustainability principles in the Kumaun region, specifically with respect to social and environmental sustainability, including environmental protections like level waste management and eco-friendly utilities. There is modest engagement by the tourism sector in economic sustainability, however, there is room for improvement. Entrepreneurs overwhelmingly displayed a willingness to engage with sustainability measures but were/are constrained by finances, limited infrastructure, and ineffective policies. There was evidence to suggest that sustainability measures create jobs for the local community, protect cultures, increase the tourist experience, and improve enterprise performance. This research indicates that rural tourism enterprises have the capacity to transition to sustainable rural tourism if there is recognition from policy makers and appropriate support is available for the community to engage with sustainable rural tourism practices. The assessment of rural tourism enterprises in this research by visiting them in the field created that evidence and showed the value for using tourism as a driver for rural development. Going forward, for sustainability to become entrenched, and this is important for the Himalayas where it will ensure that sustainability is embedded in the lived realities of the people, it has to be seen as important by the rural tourism enterprises through policies and the support of an institutional framework, digital and green skills initiatives and collaborative community networks.

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