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## Natural Resources, Indigenous Livelihoods and Cultural Landscape Identity under Tourism Pressure: A Qualitative Case Study of Chikhaldara, Maharashtra

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**ABSTRACT:** The cultural landscape is a product of the interactions between natural resources, livelihoods, cultural practices and human settlement over time and is rarely addressed as one in tourism and conservation planning. This study focuses on the interconnections between natural resources, indigenous livelihood, cultural landscape identity and the pressures of tourism in Chikhaldara, Maharashtra, paying special attention to the documented interconnections between the Korku and the Gavali community. Documentary analysis and non-participant field observation methods were used for the qualitative part of the study and selected ecological, cultural, heritage and tourism sites were studied. Thematic analysis of the evidence was conducted in relation to resource use, livelihoods, cultural and spiritual connections, tourism activities, development pressures and governance. The results suggest that forests and other environmental assets, production assets (agriculture) and cultural assets (hills and culturally important sites) are all integrated and interdependent. Evidence of linkages are traditional practices related to vegetation and sacred landscapes, historic associations with heritage sites, and resource-based agricultural, forest-based and grazing livelihoods. Tourism is related to opportunities for the local economy in the hospitality sector, in the role of guide, in transport, in small businesses, but with greater activity and infrastructure development by visitors, pressure can increase on cultural landscapes, ecological systems and water and land resources. The study hence suggests an integrated cultural–social–ecological perspective for the conservation of the resources, the resilience of livelihoods and the continuity of culture and the planning of responsible tourism in the case of Chikhaldara. The proposed framework has an analytical basis for future participatory research with the local community, as the analysis is based on documentary evidence and non-participant observation.

## 1. INTRODUCTION

Cultural landscapes emerge through long-term interactions between people and their environments, in which natural features, resource-use practices, settlements, livelihoods, cultural traditions and historical memories become interconnected. Their significance therefore extends beyond physical scenery or ecological value because landscape elements may simultaneously support material needs and carry cultural, spiritual and historical meanings. UNESCO's recent work on Indigenous knowledge and ancestral places similarly emphasises the living connections among people, nature, knowledge, heritage and stewardship (UNESCO, 2025). (Tengberg et al., 2012; Plieninger et al., 2015; Díaz et al., 2018)

Chikhaldara, located in the Satpura ranges of Maharashtra's Melghat region, represents such an interconnected landscape. Its forests, hills, water bodies, agricultural areas, grasslands, streams, waterfalls and distinctive landforms support biodiversity as well as human activities. The wider region is associated with several tribal communities, including Korku, Gond, Gavali, Balai and Nihal, with Korku being a predominant tribal group in Melghat. Existing documentation shows that communities have developed resource based livelihood practices and knowledge, related to forests, farming, livestock, medicinal plants and seasonal utilization of forest resources. In the Chikhaldara region, for instance, ethnobotanical studies revealed that the Korkus had a good knowledge of medicinal plants, and in Melghat, wild edible plants studies noted that there was a high dependency on forest products (Jagtap et al., 2006; Bhogaonkar et al., 2010). These connections are also represented in the culturally significant elements of the landscape.

Literature records associations of hills with local religious practices as well as between vegetation and Korku marriage practice and Documentary evidence is linked with certain vegetation with Korku marriage practice. Associations between particular vegetation and marriage practice among the Korku are found in the literature and also between hills and local religious practices. Cultural or spiritual significance may also exist in water bodies, waterfalls and streams. These relationships show the need for landscape resources to be viewed not just as ecological assets or tourism products, but as the result of ongoing relationships between nature, socio-economic activity and culture (Choudhary & Azeez, 2020; UNESCO, 2025). Add to these relationships the tourism and development dimension. Employment and local economic activity is available in the tourism sector, mainly in the area of hospitality, guiding, transport, food and small businesses, as well as in agriculture, livestock rearing and activities related to forests in surrounding settlements. Simultaneously, the growth of infrastructure, the concentration of visitors, vehicle traffic and rising demands on land and water can put pressure on ecologically and culturally valued resources. Indigenous tourism research in recent years has revealed common issues of cultural commodification and unequal participation and weak local control, while community-based sustainable tourism has been identified through systematic reviews as key aspects of sustainability are empowerment, governance, benefit sharing and local authority. (Dam et al., 2025; Murugananatham & Patro, 2026; Porya & Chowdhary, 2026). (Saarinen, 2006; Rao & Saksena, 2021; Dolezal & Novelli, 2022).

The issue is particularly relevant because tourism and development planning can emphasise the scenic, recreational or ecological characteristics of Chikhaldara while considering community–resource relationships less explicitly. Such a sectoral approach may separate ecological conservation from livelihood security and cultural heritage even though these dimensions are closely connected. Existing Chikhaldara and Melghat studies provide valuable evidence on ethnobotanical knowledge, tribal livelihoods and natural-resource use, but these strands have rarely been synthesised into a single cultural–social–ecological interpretation of landscape identity and tourism pressure. This study addresses that gap by bringing together documented resource relationships, cultural meanings, livelihood systems and tourism-related pressures while maintaining a clear distinction between documented evidence and community perceptions that would require primary research.

Accordingly, the study examines how natural resources contribute simultaneously to livelihood support and cultural landscape identity in Chikhaldara and how tourism and development pressures may affect these interconnected systems, with particular attention to documented relationships involving Korku and Gavali communities. The analysis addresses five linked questions: how communities depend on natural resources; which landscape elements have documented cultural, spiritual or historical associations; how traditional livelihoods, resources and tourism are interconnected; what pressures may affect cultural continuity and resource-based livelihoods; and how community–resource knowledge can inform conservation and tourism planning. The objective is not to measure community perceptions statistically, but to synthesise available evidence into an analytical framework that can guide place-sensitive planning and future participatory research.

The study uses a qualitative case-study design combining documentary analysis with non-participant field observation. Documentary material includes government reports and gazetteers, tourism and ecotourism planning documents, academic and ethnographic publications, historical documentation and forest-related planning material. Selected ecological, cultural, heritage and tourism locations were considered through field observation, with attention to site condition, accessibility, infrastructure, visitor activity, resource use and visible development pressures. The evidence was presented in a thematic organization, under the following headings: natural resources, livelihoods, cultural and spiritual associations, settlement patterns, tourism and development pressures, and governance. No interviews were carried out, nor were there focus-group discussions or structured questionnaires; thus, the manuscript does not claim to reflect direct perceptions of the community.

The study offers an integrated cultural–social–ecological analysis of Chikhaldara and recognizes the resource dependency, cultural landscape identity, tourism pressure and governance as interacting sectors of planning rather than being individual planning sectors. First, literature is reviewed, followed by a conceptual framework and methodology that are presented. Results focus on community and livelihood relations, resource dependence, cultural connections, tourism connections and pressures. The results are interpreted in the context of other literature and a combined cultural-landscape management framework and monitoring dimensions are presented. The paper ends by summarising the implications and limitations of the analysis and the need for future participatory research with local communities.

## 2. LITERATURE REVIEW

The available documentary evidence suggests that there are varying relationships, though sometimes overlapping, between the natural resources and the landscape features of different communities within and around Chikhaldara. The Korku are strongly connected with agriculture and activities related to forests, traditional knowledge about forest use and cultural importance of plants and landscapes, as well as the Gavali community is linked to cattle rearing, forest grazing and pastures and historical associations with Gawilgarh Fort. The documentary evidence available in this study is less detailed in regards to the Gond, Balai and Nihal communities. The differences are significant because they illustrate that there is no one-to-one correspondence between communities and the landscape. Table 1 summarises the livelihood associations and cultural / resource relationships that are documented throughout the communities.

**Table 1.** Landscape resources associated with Chikhaldara

**Note:** Renewable = resource that can be replenished; Non-renewable = resource with limited natural replacement; Interdependent = resource function influenced by interactions with other landscape components; Independent = comparatively direct relationship. A dash (—) indicates that the source table did not specify a category or threat.

| Category | Resource     | Renewability  | Source | Role / use / purpose                                                                                                    | Relationship | Threat                                                                                | Threat associated with proposed development                                               |
|----------|--------------|---------------|--------|-------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Land     | Rock outcrop | Non-renewable | Land   | Corridor for native plant species and stepping-stone habitat supporting movement of birds, butterflies and other fauna. | Independent  | Rare and threatened plants may occur on some outcrops.                                | Land clearing for development can cause habitat loss.                                     |
| Land     | Fertile soil | Non-renewable | Land   | Used for farming.                                                                                                       | Independent  | Poor drainage and surface runoff during high rainfall can contribute to soil erosion. | Removal of topsoil from agricultural and natural landscapes can reduce land productivity. |

| Category       | Resource          | Renewability  | Source | Role / use / purpose                                                                                                                              | Relationship   | Threat                                                                                                                | Threat associated with proposed development                                                       |
|----------------|-------------------|---------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Land           | Bouldery soil     | Non-renewable | Land   | Covers much of the reserve and is mainly associated with slopes.                                                                                  | Independent    | High rainfall on slopes can contribute to soil erosion and landslides.                                                | Development-related disturbance may affect the visual and physical quality of the landscape.      |
| Land           | Lateritic loam    | Non-renewable | Land   | Occurs on hilltops and plateau areas; used for agriculture and road construction.                                                                 | Independent    | High rainfall can increase surface runoff and soil erosion.                                                           | Development and associated soil disturbance can increase erosion.                                 |
| Land / Contour | Steep slope       | Non-renewable | Land   | Provides scenic viewpoints and contributes to high-velocity runoff and catchment formation.                                                       | Interdependent | Greater susceptibility to soil erosion, reduced water absorption, vegetation loss and disruption of natural drainage. | Development can disturb soil quality and increase risks to ground- and surface-water quality.     |
| Land / Contour | East-facing slope | —             | Land   | Provides sunrise views and forms important catchment areas associated with waterfalls and cascades; contributes to the Chandrabhaga river system. | Independent    | —                                                                                                                     | Infrastructure development may reduce scenic quality and disturb major and minor catchment areas. |

| Category       | Resource           | Renewability | Source | Role / use / purpose                                                                                                               | Relationship | Threat                                                                                              | Threat associated with proposed development                                       |
|----------------|--------------------|--------------|--------|------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Land / Contour | West-facing slope  | —            | Land   | Provides sunset views.                                                                                                             | Independent  | Receives greater afternoon heat; prevailing winds include west, southwest and northwest directions. | Infrastructure development may reduce scenic quality and disturb catchment areas. |
| Land / Contour | South-facing slope | —            | Land   | Provides views of the Satpura ranges, hills, valleys, vegetation, streams and cascades; contributes to the Chandrabhaga watershed. | Independent  | Greater exposure to sunlight and higher temperatures may increase susceptibility to wildfire.       | Infrastructure development may reduce scenic quality and disturb catchment areas. |
| Land / Contour | North-facing slope | —            | Land   | More shaded, with lower temperature and higher humidity; contributes to the Adnadi watershed.                                      | Independent  | Higher humidity and lower temperatures influence local microclimatic conditions.                    | Infrastructure development may reduce scenic quality and disturb catchment areas. |

| Category | Resource        | Renewability | Source      | Role / use / purpose                                                                                                                          | Relationship   | Threat                                                                                                                                    | Threat associated with proposed development                                                                   |
|----------|-----------------|--------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Land     | Cultivable land | Renewable    | Soil, water | Supports agricultural production and local economy, including crops such as cotton, tur, masur and channa.                                    | Interdependent | Land degradation and wind- and water-induced erosion can reduce productive capacity; some farmland occurs near catchments and watersheds. | Roads, housing, resorts, restaurants and tourist facilities may lead to loss of productive agricultural land. |
| Land     | Grassland       | Renewable    | Soil, water | Reduces wind and water erosion and provides relatively inexpensive feed for livestock and wildlife; some areas may have recreational value.   | Interdependent | Exposure to sunlight and overgrazing can affect grassland condition.                                                                      | Hardscaping near tourist sites and plantation activities may alter grassland areas.                           |
| Land     | Valley          | Renewable    | Soil        | Supports catchment formation, cascades and waterfalls such as Bhimkund; contributes to streams, water channelisation and watershed functions. | Interdependent | Soil erosion, rockfall and water runoff.                                                                                                  | Resorts and tourist activities near valleys may disturb ecosystems and watershed functions.                   |

| Category | Resource        | Renewability | Source             | Role / use / purpose                                                                                                                                                 | Relationship   | Threat                                                                     | Threat associated with proposed development                                    |
|----------|-----------------|--------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Land     | Ridge           | Renewable    | Soil               | Provides visual viewpoints, supports sheet flow and contributes to valley formation through ridges and plateaus; some areas may be suitable for limited development. | Interdependent | Some ridge areas are unsuitable for construction.                          | Unplanned development can disturb the natural landscape setting.               |
| Water    | Seasonal stream | Renewable    | Rain               | Supports water catchment, farmland, ecosystems and scenic values.                                                                                                    | Interdependent | Increased evaporation under direct sunlight can reduce water availability. | Development may alter stream direction and reduce water-catchment functions.   |
| Water    | Waterfall       | Renewable    | Rain, steep slopes | Provides habitat for riparian flora and fauna, water-catchment functions and scenic viewpoints.                                                                      | Independent    | Evaporation and rainfall variability influence water availability.         | Development can damage catchment conditions and associated waterfall habitats. |

| Category   | Resource            | Renewability | Source                                      | Role / use / purpose                                                                                                                | Relationship   | Threat                                                                       | Threat associated with proposed development                                                                               |
|------------|---------------------|--------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Water      | Lake                | Renewable    | Rain                                        | Supports riparian flora and fauna, water storage, catchment functions, scenic values and domestic water supply to Chikhaldara town. | Interdependent | Evaporation and rainfall variability affect storage.                         | Development near watersheds and unplanned tourism activities may reduce storage capacity and cause ecosystem disturbance. |
| Vegetation | Predominant trees   | Renewable    | Temperature, moisture, humidity, soil, rain | Provide habitat, erosion control, microclimatic regulation and social well-being.                                                   | Interdependent | Temperature rise and habitat disturbance can affect tree-associated systems. | Habitat loss around trees may alter microclimate and ecological functions.                                                |
| Vegetation | Grasses             | Renewable    | Temperature, moisture, humidity, soil, rain | Provide seasonal ground cover and contribute to grassland ecological functions.                                                     | Interdependent | Temperature changes can affect grassland ecology.                            | Development and land-use change can disturb grassland systems.                                                            |
| Vegetation | Seasonal vegetation | Renewable    | Temperature, moisture, humidity, soil, rain | Seasonal variation contributes to landscape character and provides habitat for fauna.                                               | Interdependent | Changes in seasonal conditions may affect vegetation patterns and habitats.  | Development can disturb seasonal vegetation and associated fauna habitat.                                                 |

| Category   | Resource                              | Renewability | Source                                           | Role / use / purpose                                                                                      | Relationship   | Threat                                                     | Threat associated with proposed development                                                            |
|------------|---------------------------------------|--------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Vegetation | Reserved forests                      | Renewable    | Temperature, moisture, humidity, soil, rain      | Provide habitat, microclimatic regulation, distinctive ecological functions and economic benefits.        | Interdependent | Flora and fauna depletion can reduce ecological integrity. | Development pressure can cause habitat disturbance and loss of distinctive ecological characteristics. |
| Energy     | Solar energy                          | Renewable    | Atmospheric conditions and sunlight              | Can support electricity generation through solar cells.                                                   | Independent    | —                                                          | —                                                                                                      |
| Energy     | Prevailing summer winds (eddy effect) | Renewable    | Ridges, valleys, seasonal streams and vegetation | Potential non-conventional energy resource for future public and private use through wind-energy systems. | Independent    | Disturbance may alter wind direction and speed.            | Development should account for local wind patterns and landscape structure.                            |

**Source:** Compiled from the landscape-resource inventory in the manuscript.

## 2.1 Cultural Landscapes and Indigenous Communities

Cultural landscape scholarship focuses on the importance of the places gaining significance through the frequent interaction of ecological processes, land use, cultural practices and collective memory. These kinds of landscapes are not fixed, but rather change through the use of resources, infrastructure, governance and tourism. This view is important in the context of Chikhaldara where forests, water bodies, hills, trees and traditional places have multiple ecological, livelihood and cultural roles (Tengberg et al., 2012; Plieninger et al., 2015).

## 2.2 Tribal Communities and Traditional Ecological Knowledge

The Korku people in the Melghat region are known to have used significant forest resources, and also have knowledge about medicinal and edible plants. This type of knowledge is not in a formalized body of information, but is in living practice and in the use of resources during season. The literature thus indicates that traditional ecological knowledge should be considered in the context of the community's broader social-ecological relationship, and that it cannot be replaced by a process of documentation provided by those outside the community (Maffi, 2005; Gavin et al., 2015; Kokane et al., 2020; Wagay et al., 2019).

## 2.3 Tourism, Conservation and Community Participation

Tourism offers opportunities for livelihoods diversification in the domains of hospitality and supporting services (including guiding, transport, retail and related services), but livelihoods benefits from tourism are the outcome of organization of access to tourism, decision-making and tourism revenues. Tourism can also place a strain on water, land, vegetation and culturally sensitive areas. Studies on ethnic tourism have recently pointed to the conflict between cultural preservation and commodification and also indicate that locally defined boundaries and interpretation and participation have a positive or negative impact on cultural continuity in the context of tourism (Porya & Chowdhary, 2026). (Dolezal & Novelli, 2022; Gutierrez, 2023; Dangi & Jamal, 2016).

## 2.4 Governance and Legal Rights

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 offers a valuable governance framework as it establishes specific individual and collective forest rights and delineates the role of Gram Sabhas for forest protection, biodiversity protection and protection of forest resources. For Chikhaldara, this legal context is relevant to any planning model that proposes community participation, resource stewardship or benefit-sharing (Ministry of Tribal Affairs, Government of India, 2006).

## 2.5 Biocultural Perspectives and Landscape Vulnerability

A biocultural perspective strengthens the cultural-landscape approach by recognising that ecological diversity, cultural practices, knowledge systems and place identity can be mutually reinforcing. Recent international scholarship and UNESCO documentation emphasise the role of Indigenous and local knowledge holders in safeguarding living relationships between people and nature. In tourism contexts, vulnerability can arise when exposure to development interacts with the sensitivity of ecological and cultural resources and with unequal adaptive capacity. This provides a useful basis for interpreting the preliminary vulnerability matrix developed for Chikhaldara (UNESCO, 2025). Recent reviews also emphasise that Indigenous tourism research should account for empowerment, governance, cultural preservation and environmental consequences rather than treating tourism as a purely economic intervention (Dam et al., 2025; Muruganatham & Patro, 2026). (Gavin et al., 2015; Maffi, 2005; Vave et al., 2024)

(Choudhary & P., 2020) Studies of Korku communities document relationships with forests, medicinal plants, food resources and culturally meaningful vegetation. The present study also considers documented associations involving Gavali cattle-rearing practices and historical places, alongside the broader resource relationships of Gond, Balai and Nihal communities. The literature indicates that these relationships are spatially and historically differentiated; consequently, the study avoids assuming that all communities interact with the landscape in identical ways.

Chikhaldara is located within the wider Melghat landscape of Amravati district and is characterised by a combination of forested areas, agricultural land, settlements, steep slopes, valleys, seasonal streams, water bodies and distinctive viewpoints. These landscape components are spatially interconnected through the road network and drainage system and contribute to both ecological functions and tourism activity. These features are also distributed in space, and they provide an important context for the relationships among natural resources, community livelihoods and cultural sites and tourism pressure that is explored in this study (Figure 1).



**Figure 1.** Landscape-resource and tourism context of the Chikhaldara study area, showing major settlements, road networks, reserved forests, agricultural areas, water bodies, catchments, seasonal streams, valleys, escarpments, cascades and selected viewpoints.

### 3. INTEGRATED CULTURAL–SOCIAL–ECOLOGICAL FRAMEWORK

The study adopts an integrated framework that combines the cultural landscape perspective with social–ecological systems thinking, treating natural resources, livelihoods, cultural meanings and tourism not as separate themes but as interacting components of a single landscape system. The analytical sequence follows the relationship between the natural-resource base, livelihood and cultural use, landscape identity, tourism and development pressures, governance responses, and resulting ecological, livelihood and cultural outcomes. As illustrated in Figure 2, the natural-resource base comprises forests, soils, agricultural land, grazing areas, hills, valleys, streams, waterfalls, lakes, vegetation and other landscape elements, while community and institutional systems include Korku, Gavali and other communities, households and customary practices, Gram Sabha, forest and local government institutions, and tourism-related organisations. Livelihood and knowledge systems encompass agriculture, grazing, forest-product use, medicinal and seasonal knowledge, livestock-related activities, tourism services and small businesses, whereas cultural landscape identity is expressed through ritual practices, sacred associations, historical memory, ancestral claims, culturally significant trees and sites, and repeated social use of places. These interconnected systems are influenced by tourism and development pressures, including visitor concentration, roads, resorts and other infrastructure, waste, vehicle pressure, land conversion, water demand and potential cultural commodification. Governance and response capacity are therefore considered through legal rights, Gram Sabha participation, conservation institutions, tourism planning, interpretation, benefit-sharing and site-specific management, with outcomes assessed conceptually in terms of ecological integrity, livelihood security, cultural continuity, community equity, and the quality and resilience of the tourism experience. (Folke et al., 2016)

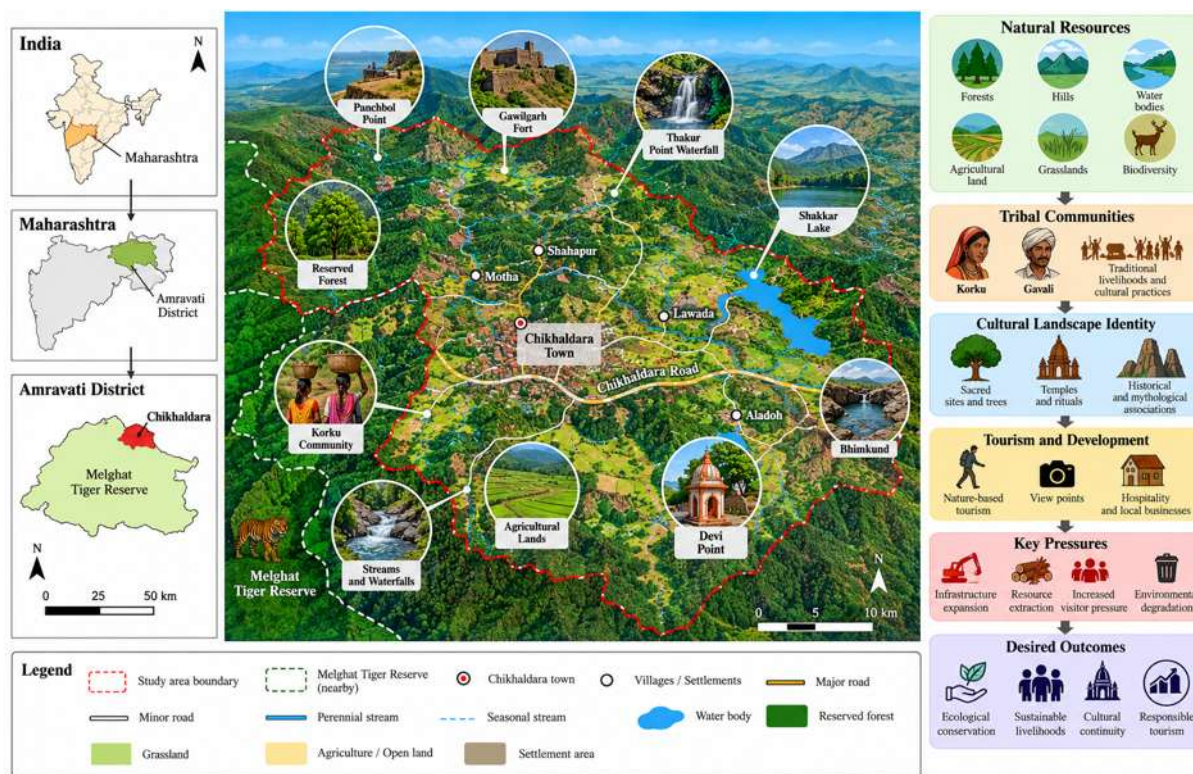


**Figure 2.** The Chikhaldara landscape system with the spatial setting, major natural and cultural resources, livelihood context of the tribes, pressures of tourism, and integrated outcomes of sustainability

Note: Spatial and conceptual synthesis created by authors based on the documentary and observational evidence in this study.

The analytical framework is based on complementary approaches of cultural landscape theory, social–ecological systems thinking, political ecology, traditional ecological knowledge and sustainable livelihoods and community based tourism (CBT) (Scheyvens, 1999). Cultural landscape theory forms a foundation for understanding relationships between nature and society, landscape identity and cultural meanings at a specific place and landscape elements. The social–ecological systems perspective adds this to the understanding by exploring interactions between ecosystems, communities, institutions and disturbances, and in doing so, acknowledge the possibility that changes in one component can influence other components of the landscape system (Ostrom, 2009). Political Ecology focuses on access, control, use of resources and distribution of benefits from tourism, whereas the Traditional Ecological Knowledge focuses on the knowledge of the community about the plants, seasons, forests, and resource-management practices. The sustainable livelihoods framework also links natural, social, human, financial and physical assets with livelihoods strategies and the community-based tourism viewpoint offers a framework for looking at community participation, culturally appropriate tourism and benefit-sharing (DFID, 1999). All of these viewpoints reinforce a holistic approach to understanding the Chikhaldara where ecological resources, community livelihoods, cultural interpretations, pressures from tourism, and governance are viewed as interrelated rather than sectorally separate (Robbins, 2012).

The theoretical integration is the basis for four analytical propositions that guide the interpretation of the documentary and observational evidence. Proposition 1: Cultural and livelihood use of landscape elements need integrated management not sector-specific one. Hypothesis 2: Local participation in governance arrangements, combined with culturally appropriate interpretation, and equitable benefit-sharing, is more likely to promote conservation and livelihood resilience through tourism. Degradation of shared land and water systems can have cascading ecological, livelihood and cultural consequences, instead of just environmental impacts (Proposition 3). To reinforce the legitimacy and local relevance of conservation and tourism planning, there is a need for recognition of community institutions and documented knowledge. The legitimacy and local relevance of conservation and tourism planning can be reinforced through recognition of community institutions and documented knowledge. These propositions are considered to be analytical propositions, not experiments to be tested in the

lab, as would be the case in a quantitative study. They serve as an interpretative framework for analysis of relationships between natural resources, the livelihood of the community, cultural landscape identity, tourism pressures and governance responses in the following analysis (UNESCO, 2025).

## 4. METHODOLOGY

A qualitative case-study design was adopted to examine the interconnected relationships among natural resources, community livelihoods, cultural meanings and tourism-related pressures in Chikhaldara. The study draws on two complementary sources of evidence: documentary analysis and non-participant field observation. The design is interpretive and exploratory, with the objective of synthesising documented relationships and identifying patterns across ecological, livelihood, cultural and tourism dimensions rather than producing statistical estimates or measuring community attitudes.

### 4.1 Research Design

A qualitative case-study design was adopted to examine the interconnected relationships among natural resources, community livelihoods, cultural meanings and tourism-related pressures in Chikhaldara. The study draws on two complementary sources of evidence: documentary analysis and non-participant field observation. The design is interpretive and exploratory, with the objective of synthesising documented relationships and identifying patterns across ecological, livelihood, cultural and tourism dimensions rather than producing statistical estimates or measuring community attitudes.

### 4.2 Documentary Evidence and Source Selection

Documentary evidence was obtained from government reports and gazetteers, district and tourism planning documents, ecotourism planning material, forest working plans, peer-reviewed academic publications, ethnographic studies, monographs, and historical and cultural documentation. Sources were identified through academic and government databases and institutional repositories, with priority given to material containing information directly relevant to Chikhaldara and the wider Melghat region. Sources were included when they provided substantive evidence concerning at least one of the following domains: natural resources and ecological functions, community livelihoods and resource dependence, cultural or spiritual practices, tourism and development, or governance and conservation.

The documentary material was organised into an evidence matrix covering five analytical domains: natural resources and ecological functions; livelihood and resource dependency; cultural, spiritual and historical associations; tourism and development pressures; and governance, threats and management responses. Evidence from different sources was compared to identify recurring relationships and to reduce dependence on individual documentary accounts when interpreting key patterns.

### 4.3 Non-participant Field Observation

Non-participant field observation was undertaken at selected ecological, cultural, heritage and tourism locations, including Devi Point, Bhimkund, Gawilgarh Fort, streams, waterfalls, forest areas and surrounding settlements. Observations focused on visible site conditions, tourism infrastructure, accessibility, visitor activity, waste, environmental pressure and the presence or absence of cultural interpretation. Field notes, photographs and site-based documentation were used as contextual evidence to complement the documentary material rather than as measures of community attitudes or perceptions.

No interviews, focus-group discussions, structured questionnaires or other direct elicitation methods were undertaken. Consequently, statements concerning cultural practices, community-resource relationships or community interests are presented only as documented evidence, observed patterns or analytical interpretations and are not represented as direct or verbatim accounts of community perspectives.

### 4.4 Study Area

The study is based on the Chikhaldara Hill Station area and selected adjoining areas in Amravati District such as Motha and Shahapur Gram Panchayat areas and villages of Shahapur, Lawada and Aladoh in Maharashtra. The study area is within the larger Satpura–Melghat area, including forests, hills, agricultural, water, settlement, heritage sites and tourism sites. The spatial nature of these features allows a geographical context for analysis of the relationship between natural resources, livelihoods and cultural landscape identity and tourism pressures.

## 4.5 Analytical Procedure and Triangulation

Thematic and Interpretive approach of analysis was used. Documentary sources and field notes were first analysed for any mention of resources, communities, livelihoods or cultural associations and tourism related activities. The observations were then coded in five main analytical themes: livelihood and resource dependency, cultural, spiritual and historical associations, settlement and landscape identity, tourism and development pressures, and governance, threats and management responses. Subsequent relationships between the codes were explored to help identify common pathways where the livelihood and cultural system may be affected by change in natural resources or development conditions. The information contained in the documentation was then compared with the field observations to find what was converging and diverging. When there was insufficient or conflicting evidence to interpret a question, the question was left uninterpreted, not assumed.

## 4.6 Limitations and Scope of Inference

The study's interpretation is necessarily constrained by its reliance on documentary evidence and non-participant observation. The analysis cannot establish the prevalence of particular cultural practices, quantify the degree of livelihood dependence on individual resources, measure tourism impacts statistically, or claim representativeness across the wider Melghat region. Similarly, the preliminary vulnerability classifications presented later in the paper should be understood as analytical judgements derived from the available evidence rather than empirically measured vulnerability scores. The study therefore provides an evidence-based interpretive framework rather than a substitute for primary ethnographic or household-level research. Future research should build on this framework through community-led interviews, participatory mapping, household livelihood assessment and stakeholder consultation to examine how the documented relationships are experienced, prioritised and interpreted by local communities.

## 5. RESULTS

### 5.1 Community and Livelihood Context

The documentary evidence indicates that communities in and around Chikhaldara have differentiated, although overlapping, relationships with land, forests, livestock and other landscape resources (Table 2). The Korku are particularly associated with agriculture, forest-dependent activities and traditional knowledge of plant resources. Ethnobotanical research conducted in Chikhaldara and neighbouring parts of Amravati documented extensive Korku knowledge concerning medicinal plants, including the use of numerous locally occurring species for different purposes. The Gavali community is associated in the available documentary material with cattle rearing, grazing resources and the milk economy, together with historical associations with Gawilgarh Fort. Evidence concerning Gond, Balai and Nihal communities is comparatively limited within the documentary sample and is therefore interpreted cautiously. This unevenness in the evidence base is itself relevant because it indicates that the documentary record does not provide an equivalent level of information for all communities represented in the wider landscape.

**Table 2.** Documented livelihood and cultural-resource associations of communities in the Chikhaldara landscape

| Community/group | Documented livelihood association        | Documented cultural/resource relationship                                                                       |
|-----------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Korku           | Agriculture and forest-linked activities | Forest knowledge; medicinal plants; Bori tree in marriage practices; Dongardeo and other spiritual associations |
| Gavali          | Cattle rearing and milk economy          | Grazing lands and historical associations with Gawilgarh Fort                                                   |
| Gond            | Agriculture and forest-linked activities | Traditional forest dependence documented in regional literature                                                 |
| Balai           | Agriculture and local occupations        | Limited evidence in the present documentary sample                                                              |
| Nihal           | Traditional and local occupations        | Regional forest and livelihood associations; requires focused study                                             |

The documentary evidence also indicates that language, settlement and resource access form part of the broader social context of the landscape. However, because the present study does not undertake a demographic or linguistic survey, these dimensions are treated as contextual rather than quantitatively assessed variables.

## 5.2 Resource Dependency Patterns

The evidence indicates that resource dependence in Chikhaldara is multidimensional rather than confined to a single livelihood activity. Agriculture relies directly on arable land, access to soil and water resources, and forest resources for their material products and traditional ecological and ethnobotanical knowledge. Korku communities in the Chikhaldara region have been specifically studied for their knowledge about medicinal plants and such knowledge is linked to a broader understanding of Korku local resource-use system. The grazing lands support livestock-based activities which relate to the Gavali community, and streams, waterfalls and other water bodies have domestic, agricultural, ecological and recreational purposes. Resource availability is related to the agricultural activities, as well as other livelihood practices, through seasonal variation. These relationships suggest that the resources of land, vegetation and water are not separable; changes to one resource system may impact another.

The resource-dependency pattern is as such defined as interdependence between land, water, vegetation, livestock and knowledge systems. This is echoed by ethnographic data from Melghat, which indicates that livelihood and socioeconomic conditions of Korku groups are tightly related to other processes of environmental and development change.

## 5.3 Cultural, Spiritual and Historical Associations

There are a number of landscape features identified with specific cultural, spiritual or historical connections (Table 3). These relationships are indicative of the fact that landscape importance is not limited to ecological processes or aesthetic qualities. These trees, hills, water features and heritage sites take on special significance through ritual activities, mythology, historical recollection, and repeated social utilization.

**Table 3.** The cultural, spiritual and historical connections that have been documented to landscape features for Chikhaldara

| Landscape element             | Documented cultural, spiritual or historical association       | Community/scope             |
|-------------------------------|----------------------------------------------------------------|-----------------------------|
| <b>Bori tree</b>              | Associated with marriage practices                             | Korku                       |
| <b>Hills/Dongardeo</b>        | Hill-deity worship                                             | Korku                       |
| <b>Devi Point</b>             | Temple, deity and sacred association; associated water feature | Korku and other communities |
| <b>Gawilgarh Fort</b>         | Historical and ancestral association                           | Gavali                      |
| <b>Bhimkund</b>               | Mahabharata/Bhima association                                  | Wider community context     |
| <b>Streams and waterfalls</b> | Life-source and spiritual significance                         | Wider community context     |

Evidence of Korku plant knowledge is of particular quality in the ethnobotany literature. Jagtap et al. recorded 66 species of medicinal plants utilized by the Korku community in the villages of Chikhaldara and Achalpur, along with some villages of Morshi and associated traditional knowledge, linking the plant resources with a significant traditional knowledge base. The overall ethnographic studies of the Korku communities in Melghat also reveal the significance of cultural and socioeconomic ties in the region.

These associations indicate that culture plays a role in the production of cultural landscape identity, and that the physical landscape is not the only source of such identity; rather it is a dynamic between physical landscape and socially transmitted meanings.

## 5.4 Landscape, Settlement and Identity

The documentary record suggests that there is a link between settlement location, accessibility of resources, and use of the landscape, especially in the forest-fringe regions where access to natural resources has historically sustained local livelihoods.

The existing ethnographic research on the Korku of Melghat provides a broader explanatory context to the interpretation of resource access as part of the social landscape, covering socioeconomic and developmental changes that took place in communities across the region.

Ritual, spiritual connection, historical memory and repeated social use are also associated with cultural identity to specific places. Relationships to, interpretation of and recall of these physical features thus create a landscape identity. From this point of view, the landscape is an ecosystem, a source of living and a source of culture.

## 5.5 Tourism–Livelihood Linkages

Chikhaldara offers yet another economy: tourism. The evidence available suggests livelihood opportunities linked to hospitality, guiding and transportation services, retail and other activities serving visitors, along with agriculture and livestock rearing and forest-based activities, are still important in other settlements around the area. While tourism can thus diversify local livelihoods, there is a potential negative effect of tourism on existing livelihoods in that tourism development will also increase the demand for land, water, infrastructure and access to culturally significant locations (Rao & Saksena, 2021; Novelli & Scarth, 2007; Gidebo, 2023).

This interaction is especially relevant at places where tourism is redefining cultural and/or ecological resources as visitor experiences. The recent studies on ethnic tourism in India have emphasized the cultural preservation–commodification conundrum as well as the importance of locally based boundaries, guiding practices and spatial regulation within the tourism encounter. For Chikhaldara this offers light and a useful context to understand tourism as an economic process which could also influence social and cultural relationships linked to landscape resources (Dolezal & Novelli, 2022; Dangi & Jamal, 2016).

## 5.6 Tourism and Development Pressures

Through the documentary and observation evidence, there are several interconnected pathways of pressure identified, not one tourism impact. With higher levels of use, there could be physical pressures at frequently visited locations, and the roads, buildings, resorts, or other infrastructure may change the land-use pattern and landscape context. A rise in the demand for water and other services can further stress local resource systems, especially if conflict arises over the services provided, particularly between ecological and livelihood demands. Sensitive ecological sites can also be impacted by vehicle movement, waste generation and focused visitor use. In such culturally significant sites, unmanaged visitation can alter the context for the expression of rituals, historical associations, or community meaning.

A further pressure concerns the potential commodification of cultural resources. When culturally meaningful places or practices are presented primarily as tourism attractions, their meanings may become simplified or detached from the communities and practices through which they acquired significance. This does not imply that tourism necessarily produces cultural loss; rather, the evidence indicates a need for governance mechanisms that allow tourism access while retaining culturally appropriate forms of interpretation and community involvement. Recent research on sustainable ethnic tourism similarly identifies boundary-making, guiding, ritual restrictions and spatial regulation as mechanisms through which communities can mediate tourism encounters and negotiate preservation and commodification.

The principal pressure pathways identified in the study can therefore be summarised as resource use intensification, infrastructure expansion, land-use change, water demand, visitor concentration, waste and vehicle pressure, ecological disturbance, and potential cultural commodification. These pathways are interconnected because disturbance to one landscape component may generate consequences for other resource, livelihood or cultural functions.

## 5.7 Preliminary Vulnerability Synthesis

To synthesise the evidence across ecological, livelihood and cultural dimensions, a preliminary vulnerability matrix was developed. The matrix is qualitative and interpretive rather than a measured risk assessment. Exposure refers to the extent to which a resource or site is subject to identified tourism or development pressures; sensitivity refers to the potential consequences of disturbance; adaptive capacity refers to the apparent ability of the associated resource or system to accommodate or respond to change. The categories have been developed based on the documentary and observational evidence, and are meant to help identify areas that merit further study, not to give statistically sound vulnerability scores. The vulnerability synthesis is qualitative and is shown in Table 4.

**Table 4.** Preliminary qualitative synthesis of vulnerability across selected landscape resources and sites

| Resource/site                      | Exposure | Sensitivity | Adaptive capacity | Preliminary vulnerability |
|------------------------------------|----------|-------------|-------------------|---------------------------|
| Seasonal streams and waterfalls    | High     | High        | Medium            | High                      |
| Cultivable land near tourist areas | Medium   | High        | Medium            | High                      |
| Culturally significant trees/sites | Medium   | High        | Low–medium        | High                      |
| Grazing land                       | Medium   | Medium–high | Medium            | Medium–high               |
| Forest-edge settlements            | Medium   | High        | Medium            | Medium–high               |

The matrix shows that resources with multiple functions at once (such as water resources that are used for local use, ecology and tourism) may be of special management significance for integrated management. The classifications should not, however, be taken to imply any quantitative estimate of risk. They are primarily used to structure the evidence and determine priorities for future primary research.

## 5.8 Cross-Domain Synthesis

The main conclusion across the evidence base is the linkage of ecological functions with livelihood dependency and cultural meaning and tourism pressures. Water systems can serve agricultural, domestic and ecological purposes and enhance the attractiveness and identity of tourism sites. Forests serve as habitat, source of livelihood and also support traditional knowledge, such as existing ethnobotanical practices of the Korku community. Specific trees, hills, water features and heritage sites take on extra cultural meanings with respect to ritual, spiritual and historical connections. Thus, the impacts of degradation can go beyond ecological ones to impacts on livelihoods, cultural continuity and the quality of the tourism experience.

**Table 5.** Cross-domain synthesis of landscape functions, cultural meaning and tourism/development pressures

| Landscape system                     | Primary function                                       | Cultural dimension                                            | Tourism/development pressure                               | Potential consequence                                                |
|--------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Forest and vegetation</b>         | Habitat, resource collection and ecological regulation | Traditional knowledge and culturally significant plants/trees | Clearing, infrastructure and visitor pressure              | Ecological degradation and weakening of knowledge systems            |
| <b>Agricultural land</b>             | Food production and livelihood support                 | Seasonal and livelihood practices                             | Land conversion and infrastructure expansion               | Livelihood pressure and landscape fragmentation                      |
| <b>Grazing land</b>                  | Livestock and livelihood support                       | Gavali livelihood association                                 | Competing land uses and tourism development                | Reduced grazing access and livelihood vulnerability                  |
| <b>Streams, waterfalls and lakes</b> | Water supply, catchment and habitat                    | Spiritual and place-based meanings                            | Visitor pressure, altered drainage, waste and water demand | Water-system degradation and impacts on culturally significant sites |

|                                    |                                         |                                                |                                          |                                                                        |
|------------------------------------|-----------------------------------------|------------------------------------------------|------------------------------------------|------------------------------------------------------------------------|
| <b>Hills, valleys and slopes</b>   | Catchment, habitat and scenic functions | Deity associations and place identity          | Roads, construction and erosion          | Landscape fragmentation and loss of cultural setting                   |
| <b>Heritage and cultural sites</b> | Historical and tourism value            | Ancestral, ritual or mythological associations | Commodification and unmanaged visitation | Potential loss of cultural integrity or weakening of community meaning |
| <b>Landscape system</b>            | <b>Primary function</b>                 | <b>Cultural dimension</b>                      | <b>Tourism/development pressure</b>      | <b>Potential consequence</b>                                           |

The cross-domain synthesis shows that landscape functions in the study are not autonomous. Rather, they are part of a complex web of change that allows ecological change at the same time as livelihood change and cultural change. This discovery forms the empirical groundwork for the integrated cultural-social-ecological framework that is discussed in the next section.

## 6. DISCUSSION

### 6.1 Natural Resources as Cultural Infrastructure (Tengberg et al., 2012; Plieninger et al., 2015)

The results suggest that the natural resources of Chikhaldara can be understood as the cultural infrastructure as well as ecological and livelihood resources. The significance of landscape elements like Bori tree, hills linked to Dongardeo, Devi Point, Bhimkund, streams, waterfalls becomes meaningful when they are linked to various ritual, spiritual, historical and social associations. This understanding is aligned with the cultural-landscape interpretation used in this work, which holds that landscape value is created as a process that is ongoing and that continues to evolve as a result of the interactions among ecological features, human practices, meanings and memories. Places that are culturally and relationally important, therefore, may not be adequately protected by conservation measures that focus on landscape quality as a habitat resource, on the diversity of species, or on scenery. The state of such locations in terms of ecology is therefore important not only for protecting the environment, but also for maintaining the continuity of the cultural associations described in the literature in Chikhaldara.

### 6.2 Interdependence of Livelihoods and Landscape

The analysis shows, that agriculture, animal husbandry, forest-related activities and tourism are interrelated and dependent on each other in terms of land, water and ecological systems. The availability of the land and water resources for agriculture, the grazing resources for livestock and the continued availability and ecological functioning of the forest resources for livelihoods are all essential to agricultural production, livestock livelihoods and forest-linked livelihoods. Another layer of resource demand comes from tourism, including infrastructure requirements, movement of visitors, water use and accessing the site. These are times where they overlap, and there may be cumulative impacts. For instance, alterations in the watershed conditions could impact water resources; transformation or fragmentation of the arable land could impact agricultural livelihoods; loss and degradation of ecologically important vegetation or sites could weaken the physical setting associated with cultural activities; and environmental degradation could impact the quality of tourism destinations.

What is important is that this interdependence does not equate with equal importance of all the landscape resources but that changes in one resource could affect other ecological/livelihood/cultural functions. This finding aligns with a systems thinking approach to the planning of Chikhaldara where the land, water, vegetation, livelihoods, cultural significance and tourism characteristics are seen as interdependent elements that are not separate planning areas. The written ethnographic records again show that the Korku also have other relationships with natural resources beyond using them as materials, including knowledge of plants, forest work and culturally significant landscape features (Jagtap et al., 2006; Choudhary & Azeez, 2020).

### 6.3 Community Knowledge and Conservation

The documentation shows a traditional ecological knowledge is connected with medicinal plants, forest resources, seasons' availability of resources, and culturally significant landscape features. This knowledge is relevant to conservation because it is a reflection of the historically established relationships between communities and their environments. Conventional knowledge, however, should not be limited to information that can be taken from it to be used for external management. Acknowledging

community rights, meaningful engagement, ownership of knowledge and locally meaningful governance mechanisms are also significant (Berkes, 2012).

It is worth noticing this difference as a methodological consideration especially in the light of the present study whose methodological scope is restricted to the above. The fact that the research did not involve interviews, focus-group discussions, household surveys and participative research does not mean that it purports to reflect the current priorities and preferences of the community. Rather, the results reveal documented knowledge and community– resource relationships as a key area to pursue further participatory investigation. Future research using community-led documentation and participatory approaches could explore the ways in which these relationships are experienced, lived and evolving in the times of tourism and development pressures.

## 6.4 Implications for Tourism Planning

The results suggest that there is a need to incorporate economic potential along with possible ecological and cultural pressures in the tourism planning process of Chikhaldara. Tourism interventions can interact with water system, land use, infrastructure, culturally important sites, environmentally sensitive areas. Thus, visitor management, infrastructure siting, water-use planning, waste management, as well as site interpretation and cultural safeguards are all planning issues that should be looked at as one, and not as independent actions. (Novelli & Scarth, 2007; Gidebo, 2023; Rao & Saxena, 2021)

The literature also shows that communities can employ culturally constructed borders, access systems, guiding systems and space management strategies to manage tourism and cultural preservation (Porya & Chowdhary, 2026). This does not give Chikhaldara a direct comparison of what is already in place locally, but it does give them a relevant comparison. Any similar action would have to be done in an inclusive manner, with the participation of affected communities and local structures. Tourism planning should thus differentiate between promoting cultural visibility and commodifying cultural practices, and between culturally significant places as the objects of tourism and the cultivation of cultural practices for the benefit of tourists.

## 6.5 Comparison with Existing Literature and Contribution of the Study

The results are in line with the existing studies that have shown that the indigenous knowledge can be associated with the natural resource utilization and livelihoods and cultural practices. The ethnographic and ethnobotanical records of the Korku region reveal their interactions with forest resources and with medicinal plants, and the general literature on the Melghat region details the socioeconomic and developmental aspects of community–environment relations (Jagtap et al., 2006; Choudhary & Azeez, 2020). The present study continues this tradition in its synthesis, rather than offering new ethnographic discoveries. Specifically, it brings together evidence concerning natural resources, livelihoods, cultural associations, tourism and development pressures within a single cultural–social–ecological analytical framework.

The analysis also identifies important limitations in the available evidence. Published primary research specifically examining the contemporary relationships among communities, landscape resources, tourism and cultural continuity in Chikhaldara remains limited within the documentary material reviewed for this study. In particular, the present evidence does not establish how different community groups currently evaluate tourism development, resource change, governance arrangements or cultural transformation. These questions require primary, participatory research rather than inference from documentary sources. (Ramaprabha & Balamurugan, 2026)

Future research could therefore strengthen the proposed framework through participatory mapping, household-level livelihood assessment, community-defined cultural landscape inventories and spatial analysis of tourism infrastructure in relation to ecological and cultural sensitivity. Such approaches would allow the relationships identified in this study to be examined empirically and would provide a stronger basis for place-specific planning and monitoring.

## 7. INTEGRATED CULTURAL–LANDSCAPE MANAGEMENT FRAMEWORK

The findings support an integrated management framework in which ecological conservation, livelihood considerations, cultural continuity and tourism planning are treated as interconnected rather than independent objectives. The framework translates the relationships identified through documentary analysis and field observation into eight complementary management priorities.

Community-led knowledge documentation should focus on traditional ecological knowledge relating to forests, water, plants, seasonal resource use and culturally significant places. Such documentation should be undertaken through protocols that

recognise community ownership, appropriate access and the sensitivity of culturally restricted knowledge. The purpose should be to support conservation and cultural continuity without converting community knowledge into an unrestricted external resource. (Pert et al., 2015; Vave et al., 2024)

Participatory governance should provide relevant tribal representatives, Gram Panchayats, local institutions and other appropriate actors with defined roles in landscape and tourism planning. Participation should extend beyond one-time consultation towards meaningful involvement in decisions concerning resource use, tourism infrastructure, culturally significant sites and conservation priorities.

Site-specific cultural landscape protection should recognise culturally significant trees, hills, water bodies, sacred locations and heritage sites together with their surrounding ecological settings. Management should therefore consider not only the physical feature itself but also the landscape context through which its cultural or historical significance is maintained.

Livelihood-sensitive conservation should account for agriculture, livestock rearing, forest-linked activities and other documented resource-dependent livelihoods when conservation or tourism interventions are planned. Where tourism creates new economic opportunities, planning should also consider whether these activities complement existing livelihoods or contribute to competition for land, water and other resources.

Responsible tourism interpretation should communicate the ecological, historical and cultural relationships of the Chikhaldara landscape without reducing community practices to commercial attractions. Interpretation programmes should be developed in culturally appropriate ways, and locally defined access or behaviour protocols may be considered for sensitive sites where communities and relevant institutions identify such requirements.

Tourism development should be accompanied by transparent claims of local economic benefits and monitoring to allow assessment of the benefits based on observable indicators. Examples of indicators can be local tourism businesses, jobs, involvement in tourism, income generated, and donations to conservation or community facilities. The focus should be on tracking real effects and not take it for granted that tourism brings home benefits that are equitable. (Gutierrez, 2023; Dangi & Jamal, 2016)

All ecological protection should be incorporated into the planning of tourism, water-use management, waste reduction, control of erosion, assessment of the capacity of the tourists and siting of the infrastructure in an environmentally sensitive manner. Special consideration should be paid to the overlap of tourism areas with catchments, forest edges, streams, waterfalls and ecologically sensitive nature components of landscape identified in the study that were given particular consideration.

Impacts on the ecology, livelihoods and the cultural integrity of the area should be considered in an integrated impact assessment before major tourism infrastructure, land-use change or other development interventions are approved. Environmental and socioeconomic impacts should not be evaluated in isolation, but should take into account the potential interaction and cumulative effects throughout the landscape.

Taken together, these priorities constitute an integrated cultural–social–ecological management approach for Chikhaldara. The framework does not prescribe a single tourism or conservation model; rather, it identifies the principal relationships that should be considered when future planning decisions are made. Its central premise is that the ecological condition of natural resources, the viability of resource-dependent livelihoods, the continuity of cultural landscape associations and the sustainability of tourism are interconnected. The framework should therefore be treated as an analytical and planning tool emerging from the evidence reviewed in this study, rather than as a quantitatively validated management model. Its practical refinement would require participatory assessment with local communities, spatial analysis of resource and tourism pressures, and institutional evaluation of existing governance arrangements.

## 8. PROPOSED MONITORING INDICATORS

To operationalise the integrated cultural–landscape management framework, a set of monitoring indicators is proposed across ecological, livelihood, cultural, tourism and governance dimensions. The indicators are intended as a planning and monitoring framework rather than as measures already collected in the present study. They can be used by local institutions, tourism authorities, forest and conservation agencies and community representatives to establish baseline conditions and monitor changes over time. The indicators should be adapted to site-specific conditions and, where appropriate, developed through participatory processes with local communities.

## 8.1 Ecological and Resource Indicators

Monitoring should include the condition and availability of key natural-resource systems that support both ecological functions and human activities. Relevant indicators include seasonal water availability in streams, waterfalls and other water bodies; observed changes in forest and vegetation cover; condition of forest-edge areas; erosion and slope disturbance; land-use conversion around sensitive sites; waste accumulation at frequently visited locations; and changes in visitor-related pressure on water and ecological resources. Monitoring these indicators can help identify whether tourism and infrastructure development are creating cumulative pressure on resource systems.

## 8.2 Livelihood Indicators

Livelihood monitoring should examine whether changes in tourism, land use and resource availability are affecting documented resource-dependent activities. Indicators may include the continued availability of cultivable land, access to grazing areas, dependence on forest-linked resources, livestock-related activity, diversification of household income through tourism and changes in access to resources used for agriculture or other traditional occupations. Particular attention should be given to whether tourism-related development complements existing livelihoods or creates competition for land, water and other resources.

## 8.3 Cultural Landscape Indicators

Because several landscape elements have documented cultural, spiritual or historical associations, monitoring should extend beyond physical conservation. Indicators may include the physical condition of culturally significant trees, hills, water bodies and heritage locations; continuity of access to culturally significant places; condition of the surrounding landscape setting; presence and appropriateness of cultural interpretation; and documented changes in the use or management of culturally important locations. Where culturally sensitive information is involved, monitoring protocols should be developed with the relevant communities rather than relying solely on external documentation.

## 8.4 Tourism Pressure Indicators

Tourist monitoring should encompass both tourist activity and the potential consequences of this activity to the environment and culture. Appropriate indicators might include the number of visitors, seasonal concentration; visitor activity at sensitive areas; waste production; vehicle pressure; demand for water and other basic service; extension of tourism-related infrastructure; the condition of the visitor facilities; and reported or observed disturbance at culturally or ecologically sensitive sites. These indicators could help to identify economic activity driven by tourism as opposed to the pressures caused by unmanaged or concentrated tourism.

## 8.5 Governance and Participation Indicators

The inclusion of governance indicators should be viewed as a measure of whether local institutions and representatives are meaningfully engaged in decisions having an impact on the cultural landscape. Some indicators are: the involvement of appropriate community members in planning; the extent and type of participatory planning meetings; community-based cultural or ecological issues in management plans; the establishment of site-specific access protocols; the transparency of decisions and processes related to tourism; and the reporting or addressing of resource related concerns. The level of participation needs to be measured by the extent of involvement in decision-making, rather than by consultation activities alone.

## 8.6 Integrated Monitoring and Review

The indicators should not be read separately as the study has shown that there are linkages among the functions of ecology, livelihood and culture and tourism. Availability of water can impact livelihoods, ecology, and tourism, and infrastructure development can impact land use, cultural context and visitor activity. A comprehensive monitoring system should thus routinely review trends in these areas and determine if there are any cumulative effects. Priority sites should be identified first with baseline data followed by ongoing monitoring with similar indicators. The proposed indicators are a first draft of the framework for such monitoring; their validation and prioritisation in a participatory and spatially explicit research should be part of future research (Folke et al., 2016).

The proposed monitoring framework is based on the integrated cultural-social-ecological approach used in the study, and thus examines measurable areas that will need to be assessed in the future, while also acknowledging that thresholds and locally appropriate indicators and baseline values will need to be determined through follow-up empirical and participatory studies.

## 9. CONCLUSION

This study shows that the landscape identity of Chikhaldara is the result of interaction between natural resources, livelihoods, cultural meanings and tourism processes. The forests, farmland, grazing land, hills, trees, streams and waterfalls provide material benefits, and have ritual, spiritual, historical and social meaning. The analysis reveals that tourism, per se, is neither good nor bad, but rather is a product of planning, management, and control of its infrastructure, activities, cultural interpretations, use of local resources and involvement of local residents. A framework is therefore proposed for the study, which is an integrated cultural–social–ecological approach that links resource protection, livelihood security, cultural continuity and tourism governance. The framework is designed to be "evidence-bounded," as the study does not contain interviews or community-led participatory research, and should be viewed as a hypothesis-generating, planning-oriented synthesis and not as a direct reflection of community perceptions. Future research should test the framework through participatory mapping, ethnographic inquiry, household livelihood assessment and spatial analysis of tourism and ecological pressures.

## DECLARATIONS

### ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable. This study was based on documentary analysis and non-participant field observation and did not involve interviews, questionnaires, focus-group discussions, or experimental procedures involving human participants. No personal, health-related or identifiable participant data were collected.

### CONSENT FOR PUBLICATION

Not applicable. The study did not involve individual participants or identifiable personal data requiring consent for publication.

### AVAILABILITY OF DATA AND MATERIALS

The materials analysed in this study were derived from publicly available documentary sources, including academic publications, government reports, planning documents and other publicly accessible records. Field observations were used as contextual evidence. The evidence base and sources cited in the manuscript are available through the corresponding publications and institutional sources. No individual-level participant dataset was generated.

### COMPETING INTERESTS

The authors declare that they have no competing interests.

### FUNDING

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### AUTHORS' CONTRIBUTIONS

VG: Conceptualization, methodology, investigation, analysis, writing—original draft, writing—review and editing.

SM: Conceptualization, methodology, investigation, analysis, writing—original draft.

GS: writing—review and editing.

All authors read and approved the final manuscript.

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### USE OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES

During the preparation of this manuscript, the authors used generative artificial intelligence tools for language refinement, structural editing and improvement of readability. The authors reviewed and edited all AI-assisted output and take full

responsibility for the accuracy, originality and integrity of the final manuscript. Generative AI was not used to generate primary research data, fabricate findings or replace the authors' interpretation of the evidence.

## RESEARCH INVOLVING HUMAN PARTICIPANTS

Not applicable. The study did not involve recruitment of human participants, interviews, surveys, focus groups or collection of personal data.

## RESEARCH INVOLVING ANIMALS

Not applicable. No animals were involved in the study.

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