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INDIGENOUS KNOWLEDGE AND INDIAN KNOWLEDGE SYSTEMS AMONG TRIBAL COMMUNITIES IN SURAT DISTRICT GUJARAT FOR EDUCATIONAL RELEVANCE CULTURAL PRESERVATION AND SUSTAINABLE DEVELOPMENT

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ABSTRACT

Indian Knowledge Systems represent the diverse intellectual, cultural, ecological and experiential traditions developed in India through generations of observation, practice and community learning. Indigenous knowledge maintained by tribal communities constitutes an important dimension of this knowledge heritage. The present research paper examines the educational relevance, cultural preservation potential and sustainable-development significance of indigenous knowledge among tribal communities in Surat District, Gujarat. The study particularly focuses on traditional ecological knowledge, medicinal plant knowledge, food practices, agriculture, sacred groves, cultural traditions and intergenerational knowledge transmission. Surat District provides an important setting for such research because the tribal regions of Mandvi, Mangrol and Umarpada contain documented examples of sacred groves and traditional plant knowledge. A recent study of these areas documented 13 sacred groves and 382 plant species belonging to 83 families, including 50 ethno-medicinal plants. These findings indicate the substantial ecological and cultural value of local knowledge systems.

The paper adopts a descriptive and qualitative research perspective based primarily on documented literature and Surat-specific studies. It examines the relationship between indigenous knowledge, formal education, cultural identity and sustainable development. The paper proposes an educational framework through which appropriate local knowledge can be documented, critically understood and incorporated into teacher education and school-based experiential learning. The study argues that educational institutions can contribute to the

preservation of indigenous knowledge by involving community knowledge holders, developing local learning resources, encouraging field-based projects and creating responsible digital documentation initiatives. However, such integration must respect community ownership, informed consent and ethical principles. The paper concludes that the responsible integration of indigenous knowledge into Indian Knowledge Systems can strengthen culturally responsive education while contributing to biodiversity conservation, cultural continuity and sustainable community development in Surat District.

KEYWORDS: Indigenous Knowledge, Indian Knowledge Systems, Tribal Communities, Surat District, Traditional Ecological Knowledge, Tribal Education, Cultural Preservation, Sustainable Development, Teacher Education.

1. INTRODUCTION

Knowledge develops through continuous interaction between human beings and their social, cultural and natural environments. Throughout Indian history, communities have developed diverse knowledge traditions concerning agriculture, health, food, forests, water, biodiversity, crafts, architecture, language, arts, social organization and environmental management. These traditions collectively form an important part of India's knowledge heritage.

Indian Knowledge Systems are broader than classical textual traditions. They also encompass locally developed and community-based knowledge transmitted through observation, participation, oral traditions, practical experience and intergenerational learning. Tribal communities have historically contributed significantly to this knowledge heritage through their close relationship with forests, land, plants, animals, food systems and local ecosystems. Surat District provides a meaningful context for examining such knowledge. Although Surat is widely recognized as an important urban and economic centre, its geographical area also includes rural and tribal communities with distinctive cultural and ecological traditions. Mandvi, Mangrol and Umarpada are particularly relevant locations for research on indigenous knowledge and traditional ecological practices.

Existing research provides evidence of significant traditional ecological knowledge in these areas. A recent study of sacred groves in Mangrol, Mandvi and Umarpada documented 13 sacred groves across seven villages and recorded 382 plant species belonging to 83 families. The study also identified 50 ethno-medicinal plants and documented cultural beliefs and traditional conservation practices associated with the sacred groves.

Such evidence suggests that indigenous knowledge should not be viewed only as a historical or cultural subject. It has potential relevance to environmental education, biodiversity conservation, experiential learning, cultural preservation and sustainable development.

The present paper therefore examines indigenous knowledge through the broader perspective of Indian Knowledge Systems and explores how relevant elements of local knowledge can contribute to contemporary education.

2. Concept of Indigenous Knowledge

Indigenous knowledge refers to knowledge developed by local communities through long-term interaction with their environment and transmitted across generations.

It may include knowledge about:

- Plants and medicinal uses
- Agriculture and seeds
- Food and nutrition
- Forest resources
- Water management
- Weather and seasons
- Biodiversity
- Traditional crafts
- Community institutions
- Folk stories and oral traditions
- Cultural practices
- Environmental conservation

A distinctive characteristic of indigenous knowledge is its practical and contextual nature. Knowledge is often learned through participation rather than through formal classroom instruction.

For example, a child may learn to identify a medicinal plant by accompanying an elder into the forest. Similarly, knowledge about seasonal food resources may be learned through household and community activities.

This makes indigenous knowledge particularly relevant to experiential and community-based education.

3. Indian Knowledge Systems and Indigenous Knowledge

Indian Knowledge Systems provide a broader framework for understanding India's intellectual and cultural heritage. Indigenous and tribal knowledge can be examined within this framework when its historical, social, ecological and cultural contexts are appropriately understood.

For the present research, IKS is conceptualized through the following dimensions:

3.1 Ecological Knowledge

Knowledge about forests, plants, animals, biodiversity, seasons and natural resources.

3.2 Agricultural Knowledge

Traditional farming practices, seed selection, crop diversity, soil management and local environmental indicators.

3.3 Health Knowledge

Knowledge concerning medicinal plants, traditional remedies and community health practices.

3.4 Food Knowledge

Knowledge about wild edible plants, traditional food preparation, seasonal foods and food preservation.

3.5 Cultural Knowledge

Folk traditions, oral histories, festivals, songs, stories, beliefs and community practices.

3.6 Educational Knowledge

Community-based learning, learning by observation, apprenticeship, storytelling and intergenerational transmission.

4. Tribal Communities and Indigenous Knowledge in Surat District

Surat District contains diverse rural and tribal communities. Mandvi, Mangrol and Umarpada provide particularly relevant field locations for studying indigenous knowledge.

Research on sacred groves in these areas has demonstrated the connection between cultural beliefs, community practices and biodiversity conservation.

The documented sacred groves contained considerable plant diversity. The identification of 382 plant species indicates that these areas have substantial ecological importance.

The presence of 50 ethno-medicinal plants further demonstrates that local communities possess knowledge concerning plant-based health practices.

This relationship can be represented as:

Community Knowledge → Cultural Beliefs → Traditional Practices → Environmental Conservation

The relationship provides an important foundation for examining indigenous knowledge as an element of Indian Knowledge Systems.

5. Traditional Ecological Knowledge

Traditional ecological knowledge is one of the most significant dimensions of indigenous knowledge.

In Surat District, it may include:

Forest Knowledge: Community members may possess detailed knowledge of locally available plants, trees, fruits, roots, leaves and other forest resources.

Seasonal Knowledge: Communities may understand seasonal changes and their relationship with agriculture, food availability and plant growth.

Biodiversity Knowledge: Knowledge of different species and their uses contributes to community-level understanding of local biodiversity.

Sacred-Grove Knowledge: Sacred groves provide an important example where cultural beliefs and environmental conservation intersect.

Resource Management: Traditional restrictions concerning particular trees, plants or sacred areas can function as informal conservation mechanisms.

6. Traditional Medicinal Knowledge

Traditional medicinal knowledge is an important component of indigenous knowledge systems.

The documentation of 50 ethno-medicinal plants in the sacred-grove study of Mangrol, Mandvi and Umarpada demonstrates the existence of substantial local plant-based knowledge.

Such knowledge may include:

- Identification of medicinal plants
- Plant parts used
- Traditional preparation methods
- Knowledge of seasonal availability
- Local terminology
- Community practitioners
- Intergenerational transmission

However, traditional medicinal knowledge should be documented responsibly. Knowledge that is considered confidential or community-owned should not be published without appropriate consent.

7. Traditional Food Knowledge

Food traditions represent another important component of indigenous knowledge.

Traditional communities may possess knowledge of: Wild edible plants, Seasonal vegetables, Fruits, Roots and tubers, Traditional recipes, Food preservation and Locally available nutritional resources

Documentation of traditionally used wild edible plants in Mandvi demonstrates the relevance of local food knowledge to nutrition, food security and cultural practices.

Traditional food knowledge can also be used as an educational resource in lessons related to: Nutrition, Biology, Environmental studies, Agriculture, Local history and Culture.

8. Indigenous Knowledge and Cultural Preservation

Cultural preservation is one of the most important reasons for documenting indigenous knowledge.

Rapid social, economic and technological changes can affect traditional ways of life. Younger generations may have fewer opportunities to learn traditional practices directly from elders.

This creates a potential knowledge gap:

Elders → Traditional Knowledge → Younger Generation

If intergenerational transmission weakens, valuable knowledge may gradually disappear.

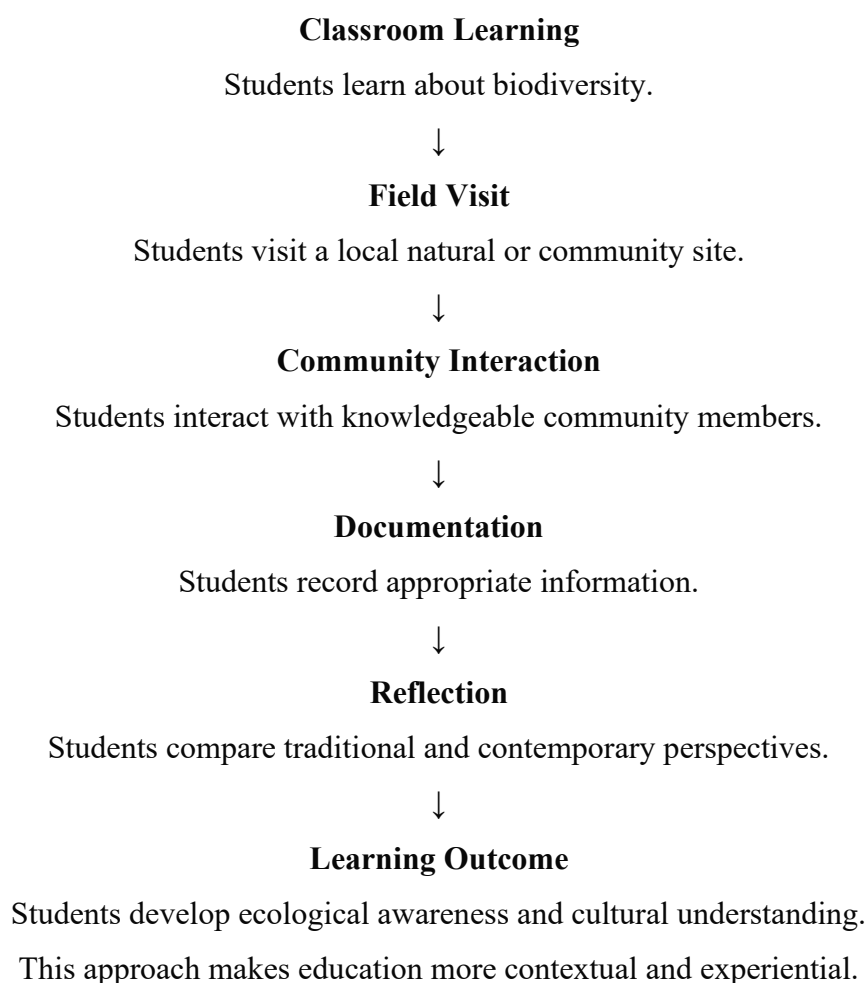
Educational institutions can help strengthen this transmission by creating opportunities for students to interact respectfully with community knowledge holders.

9. Indigenous Knowledge and Education

Education can play a central role in preserving and interpreting indigenous knowledge.

Rather than simply adding traditional information to textbooks, educational institutions can use indigenous knowledge as a basis for experiential learning.

For example:



10. Role of Teacher Education

Teacher education institutions can become important centres for IKS preservation.

B.Ed. student-teachers can be trained to:

- 1) Identify local knowledge resources.
- 2) Conduct community-based learning activities.
- 3) Document oral traditions responsibly.
- 4) Develop local teaching-learning materials.
- 5) Conduct field-based projects.
- 6) Connect local knowledge with curriculum subjects.
- 7) Encourage environmental awareness.
- 8) Promote respect for cultural diversity.

A B.Ed. programme in Surat District could therefore include a practical component titled:

“Documentation and Educational Exploration of Local Indian Knowledge Systems of Surat District.”

11. Research Gap

Existing research in Surat has documented important dimensions of traditional ecological and plant knowledge, particularly sacred groves and ethno-medicinal plants.

However, greater attention is required to the educational dimension of this knowledge.

The major research gap can therefore be stated as:

Existing studies have documented aspects of indigenous ecological knowledge in Surat District, but comparatively limited attention has been given to how such knowledge can be responsibly connected with teacher education, school curriculum, experiential learning and sustainable development.

The present paper addresses this conceptual and educational gap.

12. Need and Significance of the Study

The study is significant in the following areas.

Educational Significance: Local knowledge can provide contextual learning opportunities for students.

Cultural Significance: Documentation can support preservation of cultural traditions and community identity.

Environmental Significance: Traditional conservation practices can contribute to biodiversity awareness.

Teacher-Education Significance: Teacher educators can prepare future teachers to use local knowledge appropriately.

Sustainable-Development Significance: Indigenous knowledge may provide locally appropriate perspectives on resource management.

Research Significance: The study can establish a foundation for future empirical research in Surat District.

13. Statement of the Problem

Indigenous Knowledge and Indian Knowledge Systems among Tribal Communities in Surat District Gujarat for Educational Relevance Cultural Preservation and Sustainable Development.

14. Objectives of the Study

- 1) To identify major forms of indigenous knowledge prevalent among selected tribal communities in Surat District.
- 2) To examine traditional ecological knowledge associated with local biodiversity and sacred groves.
- 3) To study traditional knowledge related to medicinal plants and food resources.
- 4) To examine the mechanisms of intergenerational transmission of indigenous knowledge.
- 5) To explore the educational relevance of indigenous knowledge.
- 6) To identify challenges affecting the preservation of indigenous knowledge.
- 7) To examine the role of teacher education in preserving and transmitting relevant IKS.
- 8) To propose an educational framework for the responsible integration of indigenous knowledge into formal education.

15. Research Questions

- 1) What forms of indigenous knowledge are prevalent among selected tribal communities in Surat District?
- 2) How is indigenous knowledge transmitted across generations?
- 3) What role do sacred groves play in traditional ecological knowledge?
- 4) What educational value can be derived from local indigenous knowledge?
- 5) What challenges affect the preservation of indigenous knowledge?
- 6) How can teacher education contribute to the preservation of relevant IKS?
- 7) How can indigenous knowledge contribute to sustainable development?

16. Research Methodology

16.1 Research Approach

A **mixed-method approach** is recommended for empirical investigation.

16.2 Research Design

The study may use: (1) Descriptive survey (2) Qualitative field study (3) Semi – structured interviews (4) Observation and (5) Documentary analysis

16.3 Study Area

The proposed field area includes selected tribal/rural locations of: Mandvi, Mangrol, Umarpada

These locations are particularly relevant because of documented traditional ecological knowledge and sacred-grove practices.

16.4 Proposed Sample

Table 1

Participants	Proposed Number
B.Ed. Student-Teachers	200
School Teachers	50
Teacher Educators	30
Community Knowledge Holders	30
Total	310

17. Sampling Techniques

The following sampling techniques may be used:

Student-Teachers: Stratified random sampling.

School Teachers: Simple random or stratified sampling.

Teacher Educators: Purposive sampling.

Community Knowledge Holders: Purposive and snowball sampling.

18. Research Tools

18.1 IKS Awareness Scale: A researcher-developed 5-point scale may measure awareness of: (1) Indigenous knowledge (2) IKS (3) Traditional agriculture (4) Medicinal plants (5) Traditional food (6) Sacred groves (7) Cultural heritage (8) NEP 2020 and (9) Educational integration

18.2 Attitude Scale: The attitude scale may examine perceptions regarding: (1) Preservation (2) Documentation (3) Curriculum integration (4) Community participation (5) Field learning (6) Digital preservation

18.3 Interview Schedule: Community members may be interviewed regarding: (1) Traditional practices (2) Plants (3) Food (4) Agriculture (5) Forests (6) Cultural traditions (7) Knowledge transmission

18.4 Observation Schedule: The researcher may document appropriate: (1) Traditional practices (2) Natural resources (3) Sacred spaces (4) Community activities (5) Educational opportunities.

19. Data Analysis

Quantitative data may be analysed using: Frequency, Percentage, Mean, Standard Deviation, t-test, ANOVA and Pearson's correlation

Qualitative information may be analysed using: Coding, Categorization, Thematic analysis, Narrative interpretation

20. Findings

Because the present paper does include newly collected primary survey data, the following are **findings from existing documented evidence**, fabricated statistical findings.

Finding 1: Mangrol, Mandvi and Umarpada contain documented sacred-grove traditions associated with indigenous communities.

Finding 2: A recent study documented **13 sacred groves** in the selected areas.

Finding 3: The same study documented **382 plant species belonging to 83 families**, indicating considerable biological diversity.

Finding 4: **50 ethno-medicinal plants** were documented, demonstrating the importance of traditional medicinal knowledge.

Finding 5: Traditional beliefs and community practices contribute to the protection of sacred natural areas.

Finding 6: Intergenerational transmission is important for maintaining traditional knowledge.

Finding 7: Education and community participation can provide mechanisms for strengthening knowledge preservation.

21. DISCUSSION

The evidence indicates that indigenous knowledge in Surat District represents a multidimensional knowledge system rather than a collection of isolated traditional practices.

The relationship between sacred groves and biodiversity illustrates how cultural beliefs can influence environmental behaviour. Similarly, medicinal plant knowledge demonstrates the practical relationship between communities and biological resources.

From an educational perspective, such knowledge can support contextual learning.

For example, a biology lesson on biodiversity could incorporate local plant documentation. A social-science lesson could examine community institutions associated with sacred spaces.

Environmental education could investigate traditional conservation practices.

Thus, local indigenous knowledge can serve as a bridge between:

Community → Environment → Culture → Education → Sustainability

However, educational integration should not romanticize every traditional practice or assume that all traditional knowledge is automatically scientifically validated. Educational use should involve contextual understanding, appropriate scientific examination and respect for community perspectives.

23. Educational Implications

For Schools: Schools can develop local IKS projects involving: Plants, Food, Agriculture, Folk culture, Biodiversity and Local history

For B.Ed. Colleges: Teacher-education institutions can introduce field-based IKS assignments.

For Universities: Universities can establish interdisciplinary research projects involving:

Education + Botany + Sociology + Anthropology + Environmental Studies + IKS

For Community Members: Knowledge holders can participate as community resource persons.

For Students: Students can develop portfolios, field reports, interviews and educational materials.

24. Sustainable Development Implications

Indigenous knowledge may contribute to sustainable development in several ways.

Biodiversity Conservation

Traditional conservation practices can support awareness and protection of local biodiversity.

Sustainable Resource Use

Community knowledge may provide locally developed approaches to resource utilization.

Food Security

Traditional food knowledge can contribute to awareness of local food resources.

Cultural Sustainability

Preserving oral traditions and cultural practices strengthens community identity.

Educational Sustainability

Community-based learning creates stronger connections between education and local realities.

25. Challenges

Several challenges need to be considered.

- 1) Declining intergenerational transmission.
- 2) Migration and changing lifestyles.
- 3) Limited documentation.
- 4) Loss of traditional languages and terminology.
- 5) Commercial exploitation of community knowledge.
- 6) Lack of teacher training.
- 7) Limited curriculum space.

- 8) Risk of removing knowledge from its cultural context.
- 9) Intellectual-property and community-ownership concerns.
- 10) Possibility of presenting traditional claims without adequate critical examination.

26. Recommendations

- 1) Establish district-level IKS documentation initiatives.
- 2) Develop a **Surat District Indigenous Knowledge Digital Archive** with appropriate consent.
- 3) Encourage B.Ed. student-teachers to conduct local knowledge field projects.
- 4) Develop educational modules on Surat's traditional ecological knowledge.
- 5) Involve community elders and knowledge holders as resource persons.
- 6) Encourage interdisciplinary research.
- 7) Preserve local terminology and oral traditions.
- 8) Develop Gujarati and local-language learning resources where appropriate.
- 9) Promote biodiversity education through local field studies.
- 10) Ensure ethical documentation and respect for community ownership.
- 11) Encourage universities to collaborate with local communities.
- 12) Develop teacher-training programmes focused on contextual IKS integration.

27. Limitations of the Study

- 1) The present paper is primarily based on secondary literature and documented Surat-specific evidence.
- 2) It does not claim to represent the views of every tribal community in Surat District.
- 3) The proposed sample has not been treated as an actual survey sample.
- 4) Statistical conclusions require primary data collection.
- 5) Indigenous knowledge is highly contextual and varies between communities and locations.
- 6) Some community knowledge may be restricted or culturally sensitive and therefore should not be publicly documented.

28. CONCLUSION

Indigenous knowledge represents an important dimension of India's diverse knowledge heritage. The tribal communities of Surat District provide a valuable context for examining the relationship between traditional knowledge, Indian Knowledge Systems, education, cultural preservation and sustainable development.

Evidence from Mangrol, Mandvi and Umarpada demonstrates significant ecological and cultural knowledge associated with sacred groves. The documentation of 13 sacred groves, 382 plant species and 50 ethno-medicinal plants indicates the substantial knowledge and biodiversity associated with these traditional landscapes.

The educational importance of this knowledge lies not simply in preserving traditional practices but in creating meaningful connections between community knowledge and contemporary learning. Teacher education can play a central role by preparing future teachers to document, interpret and responsibly integrate appropriate local knowledge into educational experiences.

The proposed **IKS Surat Educational Integration Framework** provides a pathway from identification and documentation to community validation, teacher education, curriculum integration and sustainable development.

Ultimately, the preservation of indigenous knowledge should be understood as a collaborative process involving communities, schools, teacher-education institutions, universities and researchers. When approached ethically and critically, indigenous knowledge can contribute to culturally relevant education, environmental awareness, biodiversity conservation and sustainable development while strengthening the educational relevance of Indian Knowledge Systems in Surat District.

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