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Role Of Indigenous Knowledge and Life Skills in Climate Adaptation Among Tribal Communities of Odisha

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Abstract

Climate change poses serious challenges to the survival and livelihood systems of indigenous communities. The Saura tribe of Odisha has developed unique ecological knowledge and adapted life skills through centuries of close interaction with nature. This study explores how traditional knowledge systems, local ecological practices, and everyday life skills contribute to climate resilience among the Saura community. The research examines indigenous farming methods, forest-based subsistence strategies, water conservation practices, and cultural rituals that protect the local ecosystem. Guided by the objectives of the study, the researcher explored how the influence of cultural beliefs, rituals, and community values integrated with life skills in shaping climate-resilient behaviours. The study adopts a mixed-method approach—comprising interviews, participant observation, and case studies. The findings reveal that the integration of cultural knowledge, intra and interpersonal management skills, problem-solving skills, collective decision-making, and intergenerational learning strengthen resilience against changing climatic conditions. Overall, the study emphasises that the Saura's worldview promotes a sustainable human–nature relationship, offering valuable insights for climate adaptation policies and community-based environmental planning.

Keywords: Indigenous knowledge, Saura tribe, life skills, climate resilience, traditional practices, Odisha, sustainability, adaptation.

1. Introduction:

Climate change is one of the most important challenges facing rural and tribal communities in India today. These communities depend directly on forests, land, water, and weather for their daily life and livelihoods. Even small changes in rainfall, temperature, or seasonal timing can affect their crops, livestock, forest produce, and overall well-being. Among these communities, the Saura community of Balangir district in Odisha stands out for its strong cultural relationship with nature. For generations, they have lived in close contact with hills, forests, rivers, and natural cycles, shaping a rich store of indigenous knowledge and life skills that help them cope with environmental challenges.(Priyadarshini & Abhilash, 2019) The Saura community follows a way of life that is deeply connected with the natural environment. Their farming practices, food habits, festivals, rituals, and social customs all reflect a close understanding of local ecology. This knowledge has not come from formal education, but from long experience, careful observation, and lessons passed down from parents and elders. The elder members of the community carry memories of past droughts, floods, pest attacks, and crop failures. They know how earlier generations survived hardships and adapted to changing weather patterns. These experiences form the basis of traditional ecological knowledge. Indigenous knowledge includes various skills such as predicting rainfall by observing the sky, wind direction, bird movement, and flowering of certain plants. It also includes traditional farming methods like mixed cropping, use of local seeds, soil protection techniques, and natural pest control. The Saura community often uses drought-resistant crops such as millets, pulses, and tubers, which grow even in harsh conditions and require fewer external inputs.(Sabar & Midya, 2024) These crops not only help them survive during water scarcity but also provide nutritious food. Life skills in this context refer to everyday abilities that help the Saura people respond to challenges. For example, they know how to store food grains safely for bad seasons, collect and preserve wild fruits and edible leaves, prepare herbal medicines for common illnesses, and repair houses damaged by heavy rains or storms. They also possess skills in traditional crafts such as bamboo work, rope making, and weaving, which can provide income during difficult agricultural seasons. These skills increase household resilience and reduce their dependence on the market. Another important strength of the Saura community is their collective approach to problem-solving. Their social system supports cooperation, shared labour, and mutual help. During sowing and harvesting seasons, community members often work together in groups, especially when families do not have enough labour. This shared work reduces stress and ensures that no family is left behind. When a household faces a crisis—such as illness, crop loss, or a natural disaster—other families in the village come forward to support them. This social solidarity is a powerful life skill that protects them during times of climate stress. The Saura community's relationship with forests also plays a major role in climate adaptation. Forests are not only a source of fuel, fodder, and tubers, but also a natural safety net during difficult times. In years of crop failure, people rely heavily on non-timber forest products like mushrooms, berries, honey, medicinal plants, and wild greens.(Kumar et al., 2025a) Their knowledge of which plants are edible, which are medicinal, and which should be avoided is part of their indigenous wisdom. Sacred groves and community-protected forest patches reflect their respect for nature, which also helps conserve biodiversity and water resources. However, today this knowledge system faces several challenges. Rapid climate change brings new problems such as sudden heatwaves, untimely rains, or long dry spells that earlier generations may not have experienced. Young people migrating to towns for education or work may lose touch with traditional skills.(Imoro et al., 2022) The influence of markets, modern agriculture, and external interventions can sometimes displace local varieties and practices.(Naik

& Panda, 2023) Yet despite these pressures, indigenous knowledge continues to be an important tool for survival and adaptation. This article focuses on how the Saura community of Balangir uses their traditional knowledge and practical life skills to cope with climate change.(Meher et al., 2025) It aims to document their ecological practices, understand how they respond to changing weather patterns, and explore how their experiences can contribute to larger climate adaptation discussions in Odisha. The knowledge that the Saura people have developed through centuries of living close to nature offers valuable lessons for sustainable living, resource conservation, and resilience-building. Recognizing, preserving, and strengthening this knowledge is important not only for their community but also for broader climate policy and rural development planning.

Reviews literature:

- (Kumar et al., 2025b)Climate change hits tribal and marginalized communities hardest because of their reliance on natural resources, low income, and weak institutional support. Studies show their vulnerabilities—like poor awareness and limited adaptive capacity—are similar across regions. Indigenous knowledge in farming, forest care, and water management offers strong local solutions. Yet, policies often ignore this wisdom, creating mismatched interventions. Scholars stress collaboration, inclusive governance, and blending traditional knowledge with science to build resilience and sustainable livelihoods.
- (Nasheeda et al., 2019)Research comparing tribal and non-tribal adolescents found that non-tribal students had better life skills, self-efficacy, and academic achievement. However, gender-wise comparisons showed minimal differences in certain dimensions. This suggests that social and educational inequalities influence life skill development.
- (Mohanty & Bage, 2016)Literature reviews play an important role in identifying and synthesizing previous research on a topic. Studies on tribal development highlight issues such as social structure, education, and marginalisation. These reviews provide a foundation for understanding gaps and guiding future research.
- (Shek et al., 2021)Studies from Hong Kong reveal that while students, teachers, and parents recognize the importance of life skills, they consider life skills education inadequate in school curricula. Adolescents often perceive themselves as more skilled than adults believe. This highlights the need to strengthen life skills education systems.
- (Botvin & Griffin, 2004)The Life Skills Training (LST) program has been widely effective in preventing adolescent drug abuse. It focuses on building social resistance and personal competence. Research shows long-term positive impacts on reducing substance use, emphasizing the importance of structured life skills programs.
- (Kirchhoff & Keller, 2021)A global review of life skills education shows that developed countries have more systematic and effective programs compared to developing countries. In many developing regions, programs lack proper implementation and evaluation. This creates a need for sustainable and well-monitored life skills initiatives.
- (LIFE_SKILLS_AMONG_SCHEDULED_TRIBE_UNDERG, n.d.)Adolescence is a critical stage where individuals face various social and psychological challenges. Life skills education

helps youth manage issues like stress, unemployment, and social pressures. It bridges the gap between knowledge and practical ability, enabling better decision-making and coping mechanisms.

- (Hdyitulah et al., n.d.)School-based life skills programs promote health, self-regulation, and social development among students. Research shows that these programs vary by age, focusing more on behavioral skills in childhood and broader social skills in adolescence. However, more research is needed to ensure long-term effectiveness.

Objective

- The researcher explored how the influence of cultural beliefs, rituals, and
- Community values integrated with life skills in shaping climate-resilient behaviours.

Method

This study uses a mixed-method approach, Exploratory and Descriptive Research Design to understand how indigenous knowledge and life skills help the Saura community of Kudasingha village in Balangir district adapt to climate change. Data were collected from 40 respondents aged 25 years and above, including 25 men and 15 women, such as elders, farmers, women, youth, and local leaders. Interviews were used to learn about their experiences with farming, forests, water use, and coping with drought and changing rainfall. Participant observation helped the researcher understand daily activities, rituals, and community decisions related to the environment. A few case studies were also included to show successful local adaptation practices. This approach helped capture a clear and realistic picture of climate resilience in the Kudasingha Saura community.

Finding

Traditional Activities	Example	Like Skills
Traditional Farming	Used of Organic compost, used of wood plough, mixed agriculture	Self-awareness, critical thinking, creative thinking, Decision making, Inter personal relation
Forest Conservation	Sacred grove, plantation, community awareness	Problem-solving, effective communication, and decision-making, Effective Communication
Water conservation	Making a small pond, a traditional method of well	Self-awareness, critical thinking, creative thinking, Decision making Effective Communication, Inter personal relation

Soil Protection	Using green technology in agriculture (made from wood)	Self-awareness, Critical-thinking, creative thinking, decision making, Inter personal relation
Traditional Culture	Worship to forest, worship to land, worship to hill	Self-awareness, Critical-thinking, creative thinking, decision making, Effective Communication Inter personal relation

This table shows how traditional activities of tribal communities are closely connected with life skills and environmental protection. It reflects that indigenous practices are not only cultural but also practical ways of developing important human skills.

First, traditional farming practices such as the use of organic compost, wooden ploughs, and mixed agriculture promote sustainable agriculture. Those practices require farmers to understand nature, seasons, and soil conditions. As a result, they develop skills like self-awareness, critical thinking, creative thinking, and decision-making. Interpersonal relations are also strengthened because farming and activities are often done collectively.

Second, forest conservation practices, including sacred grove plantations and community awareness, show a strong relationship between the cultures and environmental protection. These practices encourage problem-solving and decision-making, especially when members must work together and share knowledge to protect forests.

Third, water conservation methods, such as making small ponds and traditional wells, reflect indigenous knowledge of managing water resources. These practices enhance critical thinking and creativity, as people design solutions based on local environmental conditions. Decision-making and interpersonal relations are interpersonal relation are important because water use is often managed at the community level.

Fourth, soil protection techniques, like using traditional green technology made from wood, help maintain soil fertility and prevent degradation. These activities require observation, experimentation, and cooperation, which develop critical thinking, creativity, and interpersonal skills.

Finally, traditional cultural practices, such as worship of forests, land, and hills, play a vital role in environmental conservation. These beliefs create a sense of responsibility and emotional connection with nature. They promote self-awareness and guide decision-making, while also strengthening communication and social relationships within the community.

Overall, the table highlights that indigenous knowledge systems are deeply linked with life skills development. These traditional practices not only protect the environmental but also build social cohesion, critical thinking, and sustainable living habits. Therefore, they are important for understanding community-based environmental protection and climate adaptation.

Analysis and Discussion

The findings of this study clearly show that indigenous knowledge and life skills play a strong and meaningful role in climate adaptation among the Saura community of Kudasingha village in Balangir district. Climate change is not a new or sudden challenge for the Saura people. For many generations, they have experienced droughts, uneven rainfall, crop failure, and seasonal uncertainty. These experiences have shaped their way of life and helped them develop practical knowledge to survive in difficult environmental conditions. Their close and continuous interaction with nature has enabled them to observe changes in weather patterns and adjust their practices accordingly. This study confirms that climate adaptation among the Saura community is deeply connected to cultural beliefs, everyday practices, and collective community values, rather than depending only on formal scientific or technical knowledge.

One of the most important observations of this study is the role of cultural beliefs and rituals in shaping climate-resilient behavior. Among the Saura people, rituals related to agriculture, forests, rain, and ancestors guide daily life and seasonal activities. Festivals and worship practices mark the beginning of sowing, harvesting, and forest protection periods. These rituals act as social rules that regulate human interaction with nature. They encourage people to respect forests, protect water sources, and avoid overuse of natural resources. Although these practices are religious in form, they function as practical systems of environmental management. Elders and ritual leaders play a crucial role in passing this knowledge to younger generations through stories, observation, and participation in rituals and daily work. This informal learning system strengthens ecological awareness and helps maintain environmental balance within the community.

Traditional farming practices observed in Kudasingha village further support climate adaptation. The Saura farmers continue to rely on local seeds, mixed cropping, and traditional cultivation methods that are well suited to the local environment. Drought-resistant crops such as millets, pulses, and tubers are commonly grown because they require less water and can survive harsh climatic conditions. These crops also provide nutritious food and food security during periods of scarcity. The study found that farmers use their long-term experience to predict weather changes by observing natural signs such as cloud movement, wind direction, bird behavior, and the flowering of plants. This ability to read environmental signals allows them to take timely decisions related to sowing, harvesting, and crop protection, thereby reducing the risk of crop loss.

Life skills play an equally important role in strengthening both household and community resilience. The Saura people possess a wide range of practical skills that help them cope with climate stress. These include traditional methods of storing food grains for long periods, collecting and preserving wild forest foods, and preparing herbal medicines for common illnesses. Skills related to house repair, especially after heavy rains or storms, help families recover quickly from environmental damage. Traditional crafts such as bamboo work, rope making, and weaving provide alternative sources of income when agricultural production is low. These skills reduce dependence on external markets and increase self-reliance, especially during times of crisis.

Another major strength of the Saura community is its strong social cooperation and collective approach to problem-solving. Community members often work together during farming seasons through shared labour systems. When a family faces difficulties such as illness, crop loss, or food shortage, other households

provide support in the form of labour, food, or resources. This social solidarity acts as a protective mechanism during climate stress and reduces vulnerability among weaker households. Such collective life skills play a vital role in ensuring community survival and stability.

The study also highlights the important role of forests as a natural safety net for the Saura community. Forests provide fuel, fodder, food, medicine, and income, especially during years of poor agricultural output. The Saura people possess deep knowledge of forest resources, including edible plants, medicinal herbs, and non-timber forest products. Their respect for sacred groves and community-protected forest areas helps conserve biodiversity and protect water sources. These practices not only support climate adaptation but also contribute to long-term environmental sustainability.

However, the study also points out several emerging challenges that threaten indigenous knowledge systems. Rapid climate change is creating new and unpredictable environmental conditions that are sometimes beyond past experience. Youth migration to towns for education and employment is reducing the transmission of traditional knowledge. Modern agricultural practices, market influences, and external development interventions can also weaken local practices and replace indigenous crop varieties. As a result, younger generations may lose touch with traditional skills if deliberate efforts are not made to preserve and pass on this knowledge.

Despite these challenges, the findings clearly show that indigenous knowledge and life skills remain highly relevant for climate adaptation. The experiences of the Saura community provide valuable lessons for sustainable living, resource conservation, and community-based resilience. Integrating indigenous knowledge with modern climate adaptation strategies can lead to more inclusive, effective, and culturally appropriate policies. Recognizing, documenting, and strengthening community-based knowledge systems is essential not only for the Saura community of Kudasingha but also for broader climate resilience efforts in Odisha and similar regions.

Conclusion

This study reaffirms that the indigenous knowledge system and life skills of the Saura community are not merely cultural traditions, but dynamic and practical responses to environmental change. Rooted in centuries of close interaction with nature, these practices reflect a deep ecological understanding that enables the community to adapt to climate variability with resilience and sustainability. The integration of cultural beliefs, rituals, and community values with everyday life skills creates a holistic framework for environmental protection and resource management.

The findings highlight that traditional farming, forest conservation, water management, and cultural practices are closely linked with critical life skills such as decision-making, problem-solving, and social cooperation. These interconnected systems strengthen both individual and collective resilience, ensuring survival even under adverse climatic conditions. At the same time, the study draws attention to emerging challenges such as climate unpredictability, youth migration, and the influence of modern practices, which may weaken the continuity of this valuable knowledge. Therefore, it is essential to recognize, preserve, and integrate indigenous knowledge into contemporary climate adaptation policies and development planning. Strengthening intergenerational knowledge transfer, supporting community-based practices, and creating awareness about the value of traditional systems can enhance sustainable development efforts.

The Saura community's way of life offers important lessons for building a balanced relationship between humans and nature, demonstrating that local knowledge systems can play a vital role in addressing global environmental challenges.

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