International Journal for Research Trends in Social Science & Humanities
Volume 4, Issue 6
Nov-Dec 2026, PP 1-5

Indigenous Paddy Conservation in Koraput: Agroecological Resilience, Gendered Knowledge Systems, and the Legacy of Late Kamala Pujari

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Abstract- Koraput District in Odisha, India, is globally recognized as a secondary center of origin for cultivated Asian rice (Oryza sativa) and a designated Globally Important Agricultural Heritage System (GIAHS). At the center of this agrobiodiversity conservation movement was Late Padma Shri Kamala Pujari (1949–2024), a tribal woman farmer from Patraput village who dedicated her life to preserving hundreds of indigenous paddy landraces and promoting chemical-free, monsoon-dependent agriculture. Based on M.Phil. empirical research, direct field observations in Patraput village (2019), and a review of socio-ecological literature, this paper examines the intersection of indigenous agroecology, gendered seed stewardship, and institutional recognition. The study challenges mainstream narratives that characterize tribal farming as backward, demonstrating instead that these zero-fossil-fuel, monsoon-aligned systems possess high genetic heterogeneity and climate resilience. At the same time, field findings reveal a sharp paradox: despite receiving prestigious accolades—including the Equator Initiative Award (2002), the Plant Genome Saviour Community Award (2006), and the Padma Shri (2019)—grassroots custodians like Kamala Pujari continued to live in modest socio-economic conditions without sustainable livelihood security. The paper concludes with a policy roadmap emphasizing direct financial security for grassroots knowledge holders, strengthened institutional support for community seed banks (Panchabati Gramya Unnayan Samiti), Geographical Indication (GI) tagging, and Minimum Support Price (MSP) mechanisms for traditional landraces.

Keywords- Indigenous Paddy Conservation, Koraput, Kamala Pujari, Agrobiodiversity, Gendered Knowledge Systems, Tribal Agriculture, Climate Resilience, Community Seed Banks.

I. Introduction

Koraput District, located in the Eastern Ghats of southern Odisha, represents one of the world's most significant reservoirs of rice genetic diversity. Recognized by the Food and Agriculture Organization (FAO) as a Globally Important Agricultural Heritage System (GIAHS), the Jeypore tract of Koraput harbors hundreds of traditional paddy landraces adapted to diverse micro-ecosystems, soil profiles, and erratic rainfall regimes. Beyond its botanical and agronomic value, rice cultivation in Koraput is deeply embedded in the cultural, spiritual, and ecological life of indigenous tribal communities, including the Paroja, Gadaba, Bhumia, and Kondh peoples.

A defining figure in safeguarding this living heritage was Late Kamala Pujari, a tribal woman farmer from Patraput village in Boipariguda block, Koraput. Through decades of meticulous seed selection, multi-varietal cultivation, and community mobilization, she conserved over a hundred indigenous paddy varieties—such as Kalajeera, Machhakanta, Haladichudi, and Tulasiphula—alongside traditional millets and pulses. Her contributions earned international and national recognition, notably the Equator Initiative Award at the World Summit on Sustainable Development in Johannesburg (2002), the National Gene Saviour Award (2006), and the Padma Shri (2019), India's fourth-highest civilian award.
Despite the global acclaim accorded to Koraput's agrobiodiversity, mainstream agricultural modernization policies have historically marginalized tribal farming systems. Conventional Green Revolution paradigms often dismiss indigenous practices as low-

yielding or backward, overlooking their ecological efficiency, zero-fossil-fuel footprint, and adaptive resilience against climate variability. Furthermore, while tribal women serve as the primary custodians of seed selection, storage, and soil health, they remain systematically excluded from formal land ownership, institutional credit, and agricultural extension services. This paper investigates these ecological and socio-economic dynamics through empirical observations of Kamala Pujari's farming practices and lived realities.

II. Rationale And Objectives Of The Study

Mainstream agricultural policy frequently privileges monoculture high-yielding varieties (HYVs) dependent on synthetic fertilizers and irrigation infrastructure, resulting in genetic erosion and heightened vulnerability to climate shocks. In contrast, tribal agroecosystems in Koraput rely on in-situ conservation, organic nutrient cycling, and rain-fed cultivation. Examining these systems is essential to reframe tribal farmers from passive beneficiaries of state welfare into active scientific innovators and climate stewards. Additionally, foregrounding the gendered dimension of seed conservation is vital for addressing structural inequities in rural resource governance.

The primary objectives of this study are:

- To analyze the agroecological resilience and scientific merit of indigenous, chemical-free paddy cultivation practiced in Koraput.
- To examine the central role of tribal women as custodians of traditional seed knowledge and the structural gender disparities they face in land, credit, and extension access.
- To evaluate the socio-economic realities of grassroots conservationists relative to the symbolic and institutional honors conferred upon them.
- To formulate a concrete policy roadmap for integrating indigenous ecological knowledge and grassroots livelihood security into mainstream agricultural frameworks.

III. Review of Literature

Scholarly literature on tribal livelihoods, agrobiodiversity, and gender in agriculture provides the theoretical foundation for this inquiry. Anthropological and sociological studies by scholars such as Walter Fernandes and John Gaikwad emphasize that tribal identity, social cohesion, and economic survival are inextricably linked to common property resources, forests, and customary land-tenure systems. Displacement or top-down disruption of these customary ecological relationships undermines both cultural continuity and food sovereignty.

In the domain of agricultural biodiversity, extensive documentation by the M.S. Swaminathan Research Foundation (MSSRF) in Jeypore, Koraput, demonstrates how indigenous tribal families maintain genetic heterogeneity through participatory plant breeding and community seed banks. MSSRF's work illustrates that traditional landraces possess critical adaptive traits, including drought tolerance, flood resistance, pest resilience, and high micronutrient density, which are indispensable for future crop improvement under climate change.

From a gender and development perspective, feminist political ecology and international frameworks such as United Nations Sustainable Development Goal 2 (Zero Hunger, specifically Target 2.3 and Target 2.5) highlight that women constitute the backbone of smallholder agriculture and genetic resource preservation. However, as Bina Agarwal and related agrarian scholars note, persistent gender gaps in formal land titles restrict women's

access to institutional credit, crop insurance, and state procurement mechanisms, thereby limiting the economic returns of their ecological labor.

IV. Research Methodology

This study adopts a qualitative, empirical case-study methodology grounded in M.Phil. fieldwork conducted in Koraput District, Odisha. Primary data collection centered on direct field interaction and participant observation at Late Kamala Pujari's residence and agricultural holdings in Patraput village during 2019, complemented by institutional field engagement in Koraput.

The methodological components include:

- **Direct Field Interaction and Semi-Structured Interviews:** Personal visits to Kamala Pujari's homestead in Patraput village to document her oral history, seed-selection criteria, post-harvest storage techniques, and lived socio-economic experiences.
- **Agroecological Field Observation:** Direct inspection of the rain-fed paddy fields situated behind her residence, observing soil management, organic inputs, and synchronization with natural monsoon cycles (specifically during the Shravana month) without synthetic fertilizers or chemical pesticides.
- **Visual and Artifact Documentation:** Documentation of her seed preservation repository, traditional farming implements, and national honors, including the Padma Shri medal and citation preserved at her home.
- **Secondary Literature and Policy Review:** Analysis of MSSRF conservation reports, institutional records from the Odisha University of Agriculture and Technology (OUAT), and national agricultural policy documents.

V. Empirical Findings and Discussion

1. Agroecological Efficacy of Traditional Monsoon Farming

Field observations in Patraput village confirm that Kamala Pujari's cultivation model operates as a self-sustaining, closed-loop agroecosystem. Rather than relying on external chemical inputs or fossil-fuel-intensive mechanization, her paddy fields follow natural monsoon rhythms—particularly the Shravana planting cycle—utilizing farmyard manure, green leaf compost, and natural pest-predator balances. By cultivating multiple landraces simultaneously across varying micro-topographies (uplands, medium lands, and lowlands), tribal farmers in Koraput mitigate the risk of total crop failure during erratic monsoons, prolonged dry spells, or cyclonic disturbances. This empirical reality refutes the characterization of tribal farming as primitive, demonstrating sophisticated ecological knowledge calibrated to local climate dynamics.

2. Women's Leadership and Capacity Building In Conservation

Kamala Pujari's trajectory demonstrates that formal literacy is not a prerequisite for scientific leadership in biodiversity conservation. Through experiential learning and structured capacity-building collaborations—such as training programs facilitated by MSSRF—she mastered systematic seed purification, germination testing, and community-level knowledge dissemination. She mobilized women's self-help groups across neighboring villages to abandon chemical fertilizers and revive endangered native varieties, proving that targeted institutional support can amplify grassroots women's leadership in global agrobiodiversity conservation.

3. The Paradox of Symbolic Honor Versus Livelihood Security

A critical empirical finding of this study is the stark contrast between Kamala Pujari's national stature and her material living conditions. Institutionally, her legacy was celebrated through high-profile honors, including the Padma Shri, membership on the Odisha State Planning Board, a dedicated seed bank supported by MSSRF, and a women's hostel named in her honor at the Odisha University of Agriculture and Technology (OUAT) in Bhubaneswar. Yet, field visits in 2019 revealed that she continued to reside in a modest Indira Awaas Yojana house, relying largely on a meager monthly social security pension of 500 rupees and subsistence agriculture. While she embodied remarkable warmth, humility, and hospitality despite linguistic barriers, her economic vulnerability underscores a systemic failure in policy frameworks: the state readily confers symbolic recognition on grassroots environmental defenders without guaranteeing them dignified, long-term financial security or healthcare support.

VI. Policy Roadmap and Conclusion

To ensure that indigenous paddy conservation in Koraput remains ecologically viable and socially equitable, public policy must transition from symbolic appreciation to structural empowerment. Based on the empirical findings, this study proposes a four-point policy roadmap:

- Direct Livelihood and Social Security for Grassroots Custodians: National and state awardees, alongside recognized community seed custodians, must be provided with structured, inflation-indexed honorariums, comprehensive healthcare coverage, and sustainable livelihood grants rather than nominal pensions.
- Institutional Strengthening of Community Seed Banks: Grassroots institutions such as the Panchabati Gramya Unnayan Samiti (PGUS) and village-level seed banks require dedicated fiscal allocations, climate-controlled storage infrastructure, and legal recognition under the Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act, 2001.
- Market Linkages, GI Tagging, and MSP Integration: While aromatic varieties like Koraput Kalajeera rice have secured Geographical Indication (GI) status, broader market access remains constrained. State procurement agencies must integrate indigenous paddy landraces into the Minimum Support Price (MSP) regime and public distribution or nutrition programs (such as mid-day meals and ICDS) to create assured demand.
- Gender-Responsive Land and Credit Reforms: Agricultural policy must address structural gender disparities by recognizing tribal women farmers in land-tenure records, issuing Kisan Credit Cards (KCC) to women cultivators, and routing organic farming subsidies directly to women-led producer collectives.

In conclusion, the legacy of Late Kamala Pujari illustrates that sustainable agricultural development and climate adaptation cannot be achieved solely through laboratory-driven interventions. True resilience depends on integrating tribal women's traditional ecological wisdom into mainstream agricultural policy while securing the economic dignity of the communities who safeguard these irreplaceable genetic resources.

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