

Transforming Jharkhand's Forest Economy



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Executive Summary

Jharkhand's forests generate ₹11,000 crore annually, yet tribal women who collect Seasonal Forest Products (SFPs) remain economically invisible. They are trapped in exploitative informal markets, denied legal recognition, and excluded from formal credit. The Bharti Institute of Public Policy (BIPP) at the Indian School of Business (ISB), through its Initiative on the Forest Economy (IoFE) programme, has spent nearly a decade proving this need not be inevitable.

Our work demonstrates a counterintuitive insight. Secure community land tenure, when combined with women-owned community enterprises, appropriate technology, multistakeholder partnership, and direct industrial market linkages, generates economic prosperity while strengthening forest conservation.

We transformed advocacy into institutional change. Our sustained engagement with Jharkhand's political leadership culminated in the Government of Jharkhand launching the *Abua Bir Abua Dishom* (ABAD; 'Our Forest, Our Land') campaign in November 2023. This became the state's most ambitious forest rights recognition initiative. The government adopted our JharFRA¹ mobile application as official infrastructure, digitising what had been an opaque, paper-based process that routinely failed communities. We created a comprehensive digital inventory of SFPs in Jharkhand, mapping 10,59,500 hectares of Sal (*Shorea robusta*) forests and 3,66,700 hectares of Bamboo. This evidence reframed political perception from welfare concern to economic opportunity. Our work converted 236 community forest resource rights² claims, covering 36328.11 hectares, into legal titles.

Our most significant contribution lies in institutional innovation. We established Sona Buru Jungle Producer Company (SBJPC) in April 2025. This is Jharkhand's first women-owned, forest-based community enterprise registered specifically for SFP commercialisation. With 1,008 women shareholders from 57 villages (and expanding), SBJPC sold 44.464 metric tonnes of Sal seeds for ₹14.4 lakh within three months of incorporation. Board members autonomously managed logistics, quality control, and buyer negotiations. This validated a critical insight from earlier pilot sales: temporary market facilitation through welfare-oriented co-operatives fails because it cannot provide the specialised institutional foundation the forest economy requires. Permanent, purpose-built, women-owned enterprises, focused exclusively on SFPs² and backed by formal legal status, banking relationships, and industrial buyer partnerships, create sustainable growth for the community enterprises.

¹ Download the app at https://play.google.com/store/apps/details?id=com.ratifi&hl=en_IN

² The Forest Rights Act, 2006, recognises Community Forest Resource Rights under Section 3(1)(l) for community-led access to, and management of, customary forest resources.

We now stand at an inflection point. Pilot success has generated strong political commitment, institutional partnerships, and proven models ready for systematic scaling. Under the ABAD campaign, we aim to saturate 10,000 villages covering 5.5 million (55 lakh) acres, benefiting 11 million (1.1 crore) people. Through a partnership with Sidho-Kanho Agriculture and Forest Produce State Co-operative Federation Limited (SIDHKOFED), we will establish 70 Producer Companies (PCs)³ with 2,00,000 women shareholders, generating 7,500 jobs and directly impacting 2,09,500 people. Women will transition from invisible labourers to business owners with legal identity and negotiating power. Communities will shift from vulnerable occupants to rights-holders investing in forest stewardship. Industrial buyers will gain transparent supply chains. Governments will achieve economic development while strengthening conservation.

Our work in Jharkhand demonstrates that women's economic empowerment and environmental sustainability are mutually reinforcing. This model is replicable across India's forested landscapes, offering a pathway to transform millions of forest-dependent communities.

³ A PC is a body corporate of primary producers, formed under Chapter XXIA of the Companies Act, 2013. The PC model blends the community focus of a cooperative with the structured governance of a private company.

List of Abbreviations

ABAD	Abua Bir Abua Dishom
AAKIPL	AAK India Private Limited
BIPP	Bharti Institute of Public Policy
BoD	Board of Directors
CEO	Chief Executive Officer
CFRMC	Community Forest Resource Management Committee
CFRR	Community Forest Resource Rights
CNN	Convolutional Neural Network
DLC	District Level Committee
FES	Foundation for Ecological Security
FPC	Farmer Producer Company
FRA	Forest Rights Act
FRC	Forest Rights Committee
GIS	Geographic Information System
GMKST	Gumla Mahila Kisan Swavlamban Trust
GPS	Global Positioning System
GST	Goods and Services Tax
ICFG	Institute of Community Forest Governance
IIT	Indian Institute of Technology
IoFE	Initiative on the Forest Economy
ISB	Indian School of Business
JJBA	Jharkhand Jungle Bachao Andolan
JSLPS	Jharkhand State Livelihood Promotion Society
MoU	Memorandum of Understanding
MSME	Micro, Small and Medium Enterprises
NABARD	National Bank for Agriculture and Rural Development
NGO	Non-Governmental Organisation
PC	Producer Company

PDAG	Policy & Development Advisory Group
PHIA	Powering Hope into Action
PRADAN	Professional Assistance for Development Action
QR	Quick Response
SBJPC	Son Buru Jungle Producer Company
SDLC	Sub-Divisional Level Committee
SFP	Seasonal Forest Products
SIDHKOFED	Sidho-Kanho Agriculture and Forest Produce State Co-operative Federation Limited
SKIPA	Shri Krishna Institute of Public Administration
SoP	Standard Operating Procedure
SRUTI	Society for Rural, Urban and Tribal Initiative

1. Introduction

Jharkhand has 32% forest cover (~2.5 million/ 25 lakh hectares). Over one quarter of its population depends on forests for livelihoods through the collection and trade of seasonal forest products (SFPs), such as Sal seeds, Karanj (*Pongamia pinnata*), and Bamboo (*Bambusa bambos*). As this is back-breaking, low-income work, mostly women are engaged in collecting and selling small quantities of these SFPs for decades yet remain largely invisible and mostly undervalued. The current informal nature of the trade renders their labour economically invisible, trapping them and their families in subsistence cycles.

The informality of the forest economy also creates systemic barriers that exclude women collectors from accessing formal credit, obtaining legal identity as producers, securing protection from price manipulation, and exercising voice in market negotiations. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, commonly known as the Forest Rights Act, FRA⁴, provides a progressive legal framework recognising Community Forest Resource Rights (CFRR). These rights grant forest-dependent communities governance and management authority over their traditional forest lands. However, significant implementation gaps have prevented the realisation of this potential. Without operationalised tenure rights, communities lack the legal foundation to formalise their economic activities, negotiate as rightful stakeholders, or invest in sustainable forest management practices. The lack of secure tenure and fragmented trade structure prevents effective aggregation of SFPs and inhibits investment in technology-both mechanisation and digitisation-that could unlock economies of scale. Furthermore, the absence of formal institutional frameworks results in limited supply chain accountability and constrained sectoral investment. It also leads to missed opportunities for sustainable forest management that could simultaneously advance community income and conservation goals. As a result, despite Jharkhand's forests holding an estimated economic potential of ₹11,000 crore, the women performing this foundational labour remain excluded from formal economic systems and pathways to wealth accumulation.

The Bharti Institute of Public Policy (BIPP) at the Indian School of Business (ISB), through its Initiative on the Forest Economy (IoFE) programme, has built on nearly a decade of sustained engagement with Jharkhand's forest economy. In 2015, we began with scoping studies and exploratory dialogues with government officials, local civil society organisations, and political leadership. In 2021, the work converged and formalised through a Memorandum of Understanding (MoU) with the Department of Scheduled Tribe, Scheduled Caste, Minority and Backward Class Welfare and the Department of Forest, Environment & Climate Change, Government of Jharkhand. Since then, IoFE has continuously implemented and experimented

⁴ Read details of FRA act- <https://tribal.nic.in/FRA.aspx>

with interventions through a multi-stakeholder approach to transform this landscape. Recognising that operationalising the FRA's tenure provisions is foundational to economic formalisation, loFE has collaborated closely with the government to accelerate CFRR recognition through a statewide campaign by providing technical support for claim filing, capacity building, and policy implementation. Tribal women have sustainably collected forest products for generations and possess deep knowledge of local ecosystems; loFE institutionalises their expertise by facilitated the establishment of women-owned, forest-based Producer Companies (PCs)⁵, where women become shareholders and economic decision-makers. Through strategic political support, accelerated tenure security, digitisation of value chains, and integration of SFPs into formal markets, these PCs will create sustainable, scalable pathways for economic prosperity while preserving biodiversity and ecosystem services within the forest landscape.

2. Reimagining the Forest Economy: Our Approach and Theory of Change

Transforming the informal forest economy requires addressing the structural causes that perpetuate the overlap between forest dependence and poverty: insecure land tenure, supply chain invisibility that renders women's labor economically unrecognized, fragmented operations resulting in severe diseconomies of scale, and chronic underinvestment in finance and technology.

loFE's strategic framework aims to demonstrate that when forest-dependent communities secure land tenure, achieve aggregation economies, establish direct market visibility, and access appropriate investment in finance and technology, they generate shared prosperity while protecting biodiversity and reducing emissions—resolving the false trade-offs that have long dominated forest governance discourse.

⁵ A PC is a body corporate of primary producers, formed under Chapter XXIA of the Companies Act, 2013. The PC model blends the community focus of a cooperative with the structured governance of a private company.

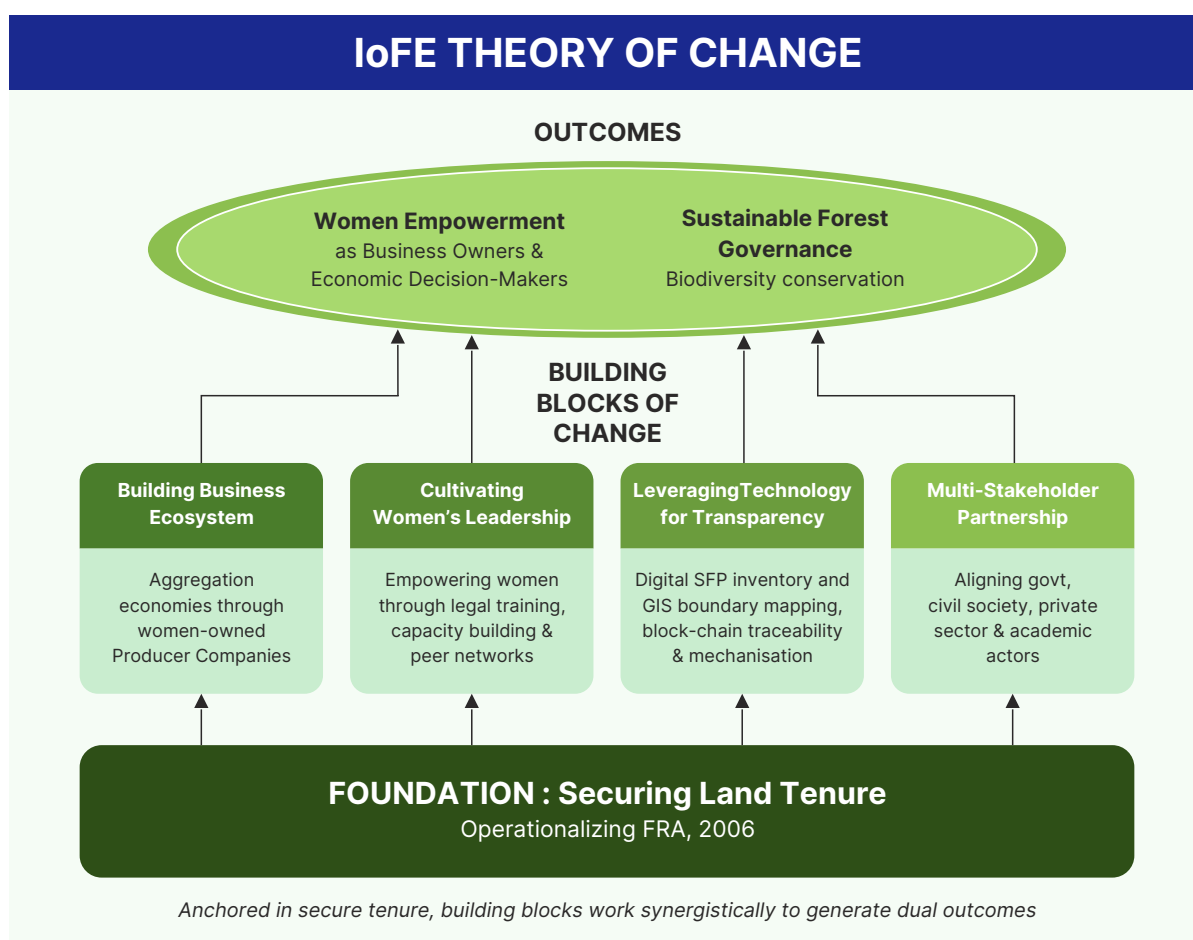


Figure 1: Flowchart of the Initiative on the Forest Economy (IoFE) Theory of Change.

Foundation: Securing Land Tenure

Secure land tenure is the essential foundation upon which all other interventions rest. We work to operationalise the FRA, 2006, transforming collectors from informal laborers into rights-holders capable of collective action and economic agency. Without legal recognition of forest rights, communities cannot formalise their economic activities or invest back in sustainable management of their forests.

Four Building Blocks of Change

1. **Building a Business Ecosystem** – We create economies of aggregation through women-owned PCs. These enterprises enable communities to capture value locally while establishing formal market linkages with industrial buyers, addressing the fragmentation that has kept SFPs in the informal economy.
2. **Cultivating Women's Leadership** – We equip women collectors to lead enterprises through trainings, capacity building, and peer learning networks that strengthen their agency and institutional effectiveness while recognising their deep knowledge of forest ecosystems.

- 3. Leveraging Technology for Transparency and Efficiency** – We integrate mechanical and digital innovations—from Geographic Information System (GIS)-enabled boundary mapping to a blockchain-based supply chain traceability application. These tools increase transparency and traceability, maintain community ownership of data, and enable evidence-based management.
- 4. Multi-Stakeholder Partnership** – We partner with governments, civil society organisations, the private sector, and academic actors by leveraging comparative advantages towards shared objectives. We maintain community agency as the central organising principle, thereby creating enabling ecosystems for transformation.

Anchored in secure land tenure, these building blocks work in sequence and in synergy: tenure enables aggregation; aggregation unlocks market linkages; and visibility and trust invite investment. Together, they deliver women's empowerment and strengthen sustainable forest governance.

3. The Journey: Photo Timeline

Our work in Jharkhand has progressed through successive phases. The timeline highlights milestones that shaped our approach and laid the foundation for systematic transformation.

2021

From MoU to Groundwork: State Partnership for CFRR Recognition



Picture 1: Formalisation of the Partnership through a Memorandum of Understanding (MoU) in December 2021.



Picture 2: Groundwork for CFRR Initiated in Simdega District.

2022

MoU with AAK India



Picture 3: MoU signed with AAK India Private Limited (AAKIPL) For Market Linkages and Value Chain Development in November 2022.

2023

Training, Aggregation, and First Sales



Picture 4: Training Sessions on Sal-Seed Collection in Kolebira, Bano, and Jaldega Blocks, Simdega, Conducted in May 2023.



Picture 5: AAKIPL's Head of Procurement Conducting Training to Equip over 100 Women in Sal-Seed Collection in Simdega.



Picture 6: Kolebira Farmer Producer Company (FPC) Dispatching a Truckload of 72,000 kg of Sal Seeds to AAKIPL on 11 June 2023.

Testing of RatiFi App for Statewide Launch



Picture 7: District Forest Officer, Simdega, Testing the RatiFi Application.



Picture 8: Forest Range Officers, Members of the Sub-Divisional Level Committee, Testing the RatiFi Application.



Picture 9: RatiFi Testing by Members of the Buruergi Forest Rights Committee (FRC) in Bano block, Simdega.

Launch of the ABAD Campaign



Picture 10: Chief Minister Hemant Soren Launching the Abua Bir Abua Dishom (ABAD; 'Our Forest, Our Land') Campaign on 6 November 2023.

Adoption of RatiFi Technology as JharFRA



Picture 11: JharFRA Application Interface under the ABAD Campaign.



Picture 12: FRC Members Navigating the JharFRA Application for Claim Filing.

Formation of the State-Level FRA Cell under the ABAD Campaign



Picture 13: Meeting of the State-Level FRA Cell with the Tribal Welfare Commissioner, PHIA Foundation, FES, and the Bharti Institute of Public Policy (BIPP), Indian School of Business (ISB).

2024

Facilitation of Training for Claim Filing Under the ABAD Campaign



Picture 14: A Three-Day Training of Master Trainers on the FRA under the ABAD Campaign at the Shri Krishna Institute of Public Administration (SKIPA), Ranchi.



Picture 15 a



Picture 15 b

Picture 15a–15b: Block Level Training on the Use of JharFRA for Claim Filing.

Preparation of the CFRR Claim-Filing Delivery Kit



Picture 16 a



Picture 16 b

Picture 16a–16b: CFRR Claim-Filing Resource Kits.

Testing Innovative Doorstep Delivery Methods



Picture 17 a



Picture 17 b

Picture 17a–17b: CFRR Claim-Filing Resource Kits Delivered to FRCs.

Title Distribution



Picture 18: Distribution of CFRR titles by Chief Minister Hemant Soren on the Occasion of the International Day of the World's Indigenous Peoples (9 August).



Picture 19: Celebration of the Van Adhikar Mahotsav.

Sal Seed Sale 2024 – Scaled Operations



Picture 20 a



Picture 20 b

Picture 20a–20b: Sal-Seed Collection by Women Collectors from Burmu Block, Ranchi District.



Picture 21: Sal Seed Harvesting Training Delivered by AAKIPL Personnel.



Picture 22: Storage of Sal Seeds at the Village Collection Point, Ensuring Quality Preservation.



Picture 23: Truckload of Sal Seeds Dispatched from Ranchi to AAKIPL's Warehouse in Bilaspur on 24 June 2024.

2025

Formation of Jharkhand's First Forest-Based, Women-Owned Producer Company



Picture 24: First 50 Shareholders of the Sona Buru Jungle Producer Company (SBJPC) Attending a Capacity-Building Workshop.

Shareholder Expansion Drive 2025



Picture 25: SBJPC Secretary Leading a Gram Sabha Meeting for Shareholder Expansion.



Picture 26 a



Picture 26 b

Picture 26a–26b: BoD Filling Shareholder Enrolment Forms for Women to Join SBJPC.

Inaugural Sale of SBJPC



Picture 27: BoD and Promoters of SBJPC Dispatching a Truckload of Sal Seeds to the AAKIPL Factory.



Picture 28: BoD of SBJPC After Successfully Dispatching a Truck to the AAKIPL Factory.

Building a Partnership with SIDHKOFED for Scale-Out



Picture 29: BIPP–ISB team Presenting at a State–Level Workshop Organised by the Sidho–Kanho Agriculture and Forest Produce State Co-operative Federation Limited (SIDHKOFED) in Ranchi on 20 August 2025.

4. Creating Change: Our Key Interventions and Outcomes

For nearly a decade, we have worked to operationalise the loFE framework in Jharkhand. Our efforts have met with both successes and setbacks, each informing the continuous refinement of our systems and approaches. Through iterative experimentation and adaptive learning, we have developed our current Theory of Change (ToC). The following subsections detail our major interventions and their outcomes.

4.1 Establishing a Multistakeholder Partnership Network

loFE works through formal partnerships across government agencies, civil society organisations, private sector actors, and research institutions. The subsections below outline our core strategic partnerships that have enabled implementation at scale.

4.1.1 Government Partnerships

In 2021, we signed a two-year MoU with the Department of Scheduled Tribe, Scheduled Caste, Minority and Backward Class Welfare and the Department of Forest, Environment & Climate Change, Government of Jharkhand. This partnership aimed to recognise CFRR under the FRA and empower forest-dependent communities to supply raw materials to industries.

In October 2024, we renewed the MoU with the Tribal Welfare Commissioner of Jharkhand to scale pilots that enable forest-dependent communities to retain a greater share of market value from SFPs. The work includes community-based inventories, boundary mapping, and partnerships with private enterprises to strengthen sustainable market linkages for women-led community enterprises.

In May 2025, we formalised a three-year MoU with the District Administration of West Singhbhum to develop a sustainable and inclusive forest-based economy. This collaboration aims to improve socio-economic outcomes for forest-dependent communities through innovative enterprise development and technology integration while ensuring ecological sustainability.

In November 2025, we will formalise a partnership with SIDHKOFED (Sidho Kanho Agriculture and Forest Produce State Co-operative Federation Limited), the apex federation for agriculture and forest produce co-operatives in Jharkhand. Operating under the Department of Cooperation, SIDHKOFED facilitates e-auction platforms for forest and agricultural commodities, supports digital and institutional innovations, and collaborates with financial institutions to improve rural livelihoods. This partnership is expected to catalyse a transformative shift towards a sustainable, inclusive, and resilient forest-based green economy in Jharkhand.

4.1.2 Private Sector Partnerships

We have established active market linkage partnerships with AAK India Private Limited (AAKIPL)⁶ and Farmart⁷. These collaborations aim to strengthen market linkages, supply chains, and institutional frameworks for tribal women-led and women-participated forest-based PCs, making SFP distribution more equitable, transparent, and financially rewarding.

⁶ AAKIPL is a global leader in plant-based oils and fats.

⁷ Farmart is India's first software-as-a-service (SaaS)-led, business-to-business (B2B) food supply platform, enabling agri-retailers and food businesses to access inputs, advisory services, and market linkages.

4.1.3 Civil Society Partnerships

We partner with SRUTI (Society for Rural, Urban and Tribal Initiative)⁸ to ensure community voices remain central to forest governance reforms. We also collaborate with the Institute of Community Forest Governance (ICFG)⁹ to empower forest-dependent communities and foster community participation in forest conservation, regeneration, and livelihoods. Their approach has evolved from a rights-based focus to include community-led enterprises that support rural livelihoods and development.

4.1.4 Knowledge and Technical Partners

We support the Jharkhand government's statewide *Abua Bir Abua Dishom*¹⁰ (ABAD; 'Our Forest, Our Land') campaign through knowledge and implementation partners, including the Foundation for Ecological Security (FES) and the PHIA (Powering Hope into Action) Foundation. Together, we provide technical expertise in community forest management and ecological restoration, coordinated through a state-level FRA cell that oversees implementation across all 24 districts.

This multi-stakeholder network demonstrates institutional congruence in action—aligning government's policy-making capacity, civil society's grassroots mobilisation, private sector's market access, and academic institutions' research capabilities towards shared objectives.

4.2 Securing Land Tenure

We build on the premise that a lack of secure tenure hinders local communities' ability to manage forests for sustainable use effectively. Therefore, our initiative aims to substantially expand secure and sustain community tenure over forests across large contiguous areas in Jharkhand to enable sustainable forest governance, strengthen community institutions, and increase livelihood security. Following the 2021 State-level MoU, we deepened our work in Simdega district and subsequently expanded to the southern belt of Jharkhand—Gumla, West Singhbhum, and East Singhbhum. This strategic geographic focus enable in-depth FRA implementation while building replicable models for statewide scale.

⁸ SRUTI provides ground-level support for CFRR advocacy and strengthening Gram Sabha institutions.

⁹ ICFG is a forest rights-based NGO that works on strengthening FRA implementation.

¹⁰ Read more about the campaign at <https://www.downtoearth.org.in/forests/how-the-abua-bir-dishom-abhiyan-in-jharkhand-empowers-forest-dwellers>



Figure 2: Priority Districts for Implementation of the Forest Rights Act (FRA) in Jharkhand: Simdega, Gumla, West Singhbhum, and East Singhbhum Districts.

4.2.1 Launch of the Statewide ABAD Campaign

Integrating technology into Jharkhand's FRA implementation required coordinated engagement with government agencies, civil society organisations, and local communities. IoFE pursued a strategic top-down approach, securing state government support for technological intervention through close collaboration with the Policy & Development Advisory Group (PDAG). This sustained engagement created the enabling conditions for adopting the JharFRA mobile application as a core tool in the state's land rights recognition architecture.

On 6 November 2023, Chief Minister Hemant Soren launched the ABAD campaign, a comprehensive campaign to grant land ownership titles (*pattas*) to forest dwellers under the FRA. The initiative prioritises expedited processing of both pending claims and new claims generated through the JharFRA mobile application.

The campaign reflects exceptional political commitment at the highest levels. The Chief Minister, Forest Secretary, and Principal Secretary have consistently emphasised FRA implementation across multiple forums, directing departments to operate in mission mode to resolve claim backlogs.

Outcomes in 2024

- **236 CFRR claims** were granted, covering **36,328.11 hectares** of forest land across Jharkhand.
- In **Simdega**, **38 new claims** covering **7,594.57 hectares** were submitted to the Sub-Divisional Level Committee (SDLC)¹¹, and **48 Community Forest Resource Management Committees (CFRMCs)** were established to support governance and management efforts.
- IoFE supported **79 communities** in filing new CFRR claims.
- Claim filing is actively underway in **East Singhbhum, West Singhbhum, and Gumla** districts.

4.2.2 Capacity Building and Claim-Filing Support in the Campaign

A major implementation challenge was ensuring that thousands of village-level Forest Rights Committees (FRCs)¹² had the technical knowledge and materials required to complete the claim-filing process. Traditional government distribution systems proved ineffective, as materials remained undistributed at district and block offices while communities awaited essential resources. IoFE developed an integrated approach that combined systematic capacity building, innovative resource-delivery mechanisms, and sustained technical support.

A Three-Tier Training Model

We designed a cascading training architecture to efficiently reach all 24 districts of Jharkhand. Rather than directly training thousands of village-level volunteers, this model created a multiplier effect through strategic capacity building at successive administrative tiers.

In December 2023, the first tier commenced at the Shri Krishna Institute of Public Administration (SKIPPA) in Ranchi. A cohort of 120 government officials from across Jharkhand—including Forest Department personnel, Revenue Officers, and e-governance managers—participated in an intensive three-day programme. These officials became Master Trainers, equipped to deliver instruction on the FRA regulations, claim-filing procedures, and digital tools.

¹¹ The SDLC is constituted by the state government under the FRA. It verifies claims and forwards them to the District Level Committee.

¹² The FRC is elected by the Gram Sabha to oversee and assist with the claim-filing process.

Concurrently, a specialised cohort of 20 Technology Trainers received focused training on the JharFRA mobile application. These technology specialists provide ongoing technical troubleshooting support and facilitate digital adoption across districts.

The second tier involved Master Trainers conducting district-level training for Bir Bandhus—panchayat-level Community Resource Persons who work directly with forest-dependent communities. These Bir Bandhus constitute the critical grassroots link, providing direct support to FRCs in claim preparation and submission.

Addressing Last-Mile Delivery Gaps

Capacity building alone proved insufficient. Well-trained FRCs continued to face material constraints: the absence of requisite forms, official boundary maps, legal documentation (Records of Rights), and practical guidance materials. The government's conventional approach—centralised printing and hierarchical distribution through district and block offices—resulted in substantial undelivered inventories at intermediate administrative levels.

In total, we trained approximately 9,000 government officials, including state-, district-, and block-level officials from the Forest Department, Revenue Department, District Collectorates, Tribal Welfare Department, and Circle Offices, through multiple sessions.

This implementation gap necessitated alternative approaches. From June to September 2024, we piloted four distinct delivery models across 273 villages to identify effective last-mile distribution mechanisms.

Pilot Testing Four Delivery Models

- **Model 1: Incentivised Bir Bandhus** – Financial stipends were provided to Bir Bandhus to test whether monetary incentives could address motivation gaps. Implementation in Dumaria and Ghatshila yielded mixed outcomes—while some volunteers completed deliveries diligently, many treated the assignment as secondary to existing responsibilities, resulting in incomplete distribution.
- **Model 2: Local Delivery Agents** – Young community members and college students were engaged as dedicated delivery agents in Bansjore and Pankartanr. Though demonstrating greater initial

motivation than Bir Bandhus, these agents frequently compromised delivery protocols by requesting FRCs to collect kits from centralised points rather than conducting village-level distribution.

- **Model 3: Vehicle-Based Distribution** – Motorised delivery teams with pre-planned routes and local language public announcements were deployed in Kersai and Musabani. This model demonstrated superior efficiency: 100% delivery completion in Kersai (15 villages in one day) and 90% coverage in Musabani (19 of 21 villages in two days). Strong coordination and community mobilisation characterised this approach.
- **Model 4: Market-Day Helpdesks** – Distribution points were established at local marketplaces (*haats*) on designated market days in Bishunpur and Bolba. Leveraging existing community congregation patterns, this model achieved 96% coverage in Bolba (25 of 26 villages) and 65% coverage in Bishunpur (41 of 63 villages), demonstrating effectiveness in community-centred distribution.

Each CFRR Claim-Filing Resource Kit contained official forms, a procedural guidebook (*Sahayika*), village-specific cadastral maps and land records, official seals and registers, stage-wise video tutorials, and helpline contact information.

Post-Delivery Technical Support Infrastructure

Resource distribution constituted only the initial intervention phase. Many FRCs, despite receiving materials, require ongoing guidance to navigate procedural complexities. We have established three complementary support mechanisms:

- **Helpline Services (*Sampark Kendra*):** Dedicated telephone helplines provide remote technical assistance. Support staff employ a structured two-contact protocol—initial calls focused on process orientation and task assignment (FRC reconstitution and Gram Sabha scheduling), while follow-up calls guide actual claim submission through the JharFRA application.
- **Weekly Helpdesks (*Sahayata Kendra*):** Physical helpdesks at block offices and marketplaces offer in-person technical assistance for complex requirements including boundary map interpretation, application registration troubleshooting, and legal procedural clarification—proving particularly valuable in areas with limited internet connectivity.

- **Continuous Engagement:** Our ground team maintains sustained communication through WhatsApp groups and periodic telephone follow-ups, creating systematic feedback mechanisms to prevent FRCs from encountering unresolved implementation barriers.

Pilot implementation has demonstrated that integrating vehicle-based bulk distribution with helpdesk-based community engagement creates an optimal delivery architecture. Vehicle deployment enables efficient territorial coverage, while helpdesks provide sustained localised technical support.

We are currently collaborating with the government to integrate this comprehensive intervention framework—combining cascading capacity building, innovative last-mile delivery, and sustained technical support—into the statewide ABAD campaign infrastructure. This approach ensures communities receive not only material resources but also technical support and continuous guidance throughout the claim-filing process.

4.3 Building a Business Ecosystem

Transforming the informal forest economy into a sustainable, formal sector requires orchestrating multiple interdependent elements. IoFE's business ecosystem approach addresses four critical components simultaneously. First, we establish direct market linkages through industry roundtables, consultations that secure sourcing commitments from industrial buyers, thereby eliminating intermediary exploitation. Second, we advance sustainable finance by partnering with Nabsamruddhi Finance Limited (a National Bank for Agriculture and Rural Development (NABARD) subsidiary). Together, we develop financial instruments tailored to forest-based livelihoods that account for seasonal cash flows, community ownership structures, and long-term investment horizons. Third, we build institutional infrastructure through women-owned PCs where forest product collectors transition from informal labourers to shareholders and economic decision-makers. These enterprises aggregate supply, negotiate collectively, and distribute value equitably among members. Fourth, we conduct grassroots mobilisation focused on community awareness, shareholder education, governance training, and operational capacity building. These interconnected interventions create an enabling architecture, with each element reinforcing the others to generate systemic change rather than isolated improvements.

4.3.1 Sal-Seed Sale through Direct Market Linkages (2023–2024)

Establishing the Model: 2023 Pilot Sale in Simdega

Following detailed inventory mapping and market studies that identified the commercial potential of Sal seeds in confectionery and oil industries, loFE initiated direct market linkage pilots in Simdega district. In October 2022, AAKIPL signed a MoU with BIPP–ISB to co-create value and endorse secure tenure rights under the FRA. The partnership agreement outlined a three-pronged approach: mechanisation to reduce collection drudgery while preserving seed quality, capacity building for aggregation, and financial inclusion initiatives. After extensive preparatory work—including stakeholder consultations with the Jharkhand State Livelihood Promotion Society (JSLPS), district administration, financial institutions, and the Kolebira Farmer Producer Company (FPC)—the first transaction took place in June 2023. The Kolebira FPC, a women-led collective of over 3,000 members in Simdega, successfully sold 72,000 kg of Sal seeds to AAKIPL for ₹10,87,650. This transaction represented the culmination of sustained coordination involving JSLPS as the mobiliser, AAKIPL as the buyer, Kolebira FPC as the seller, and loFE as the transaction facilitator. The sale was competitively priced for both the community and AAKIPL, demonstrating the viability of direct market linkages that eliminate intermediary exploitation while ensuring industrial buyer satisfaction. Collection and processing involved comprehensive quality assurance protocols, with samples tested for seed quality and moisture levels to meet AAKIPL's specifications. The successful delivery to AAKIPL's Bilaspur facility established a replicable model for direct industrial sourcing from community enterprises.

Scaling Through Multi-Partner Collaboration: 2024 Expansion

Building on learning from the 2023 pilot, loFE expanded the market linkage model in 2024 through strategic partnerships with multiple implementing organisations. A collaboration involving JSLPS, Jharkhand Jungle Bachao Andolan (JJBA), Professional Assistance for Development Action (PRADAN), and AAKIPL leveraged diverse organisational strengths and operational models. JJBA operated through an activism-based approach, PRADAN's Gumla Mahila Kisan Swavlamban Trust (GMKST) employed an NGO-based model, and JSLPS represented state-supported implementation. Together, these partners facilitated collection, aggregation, and sale through a market-driven strategy.

On 24 June 2024, 10,900 kg of Sal seeds were delivered to AAKIPL's Bilaspur facility, generating ₹2,57,529 for the Ghaghara Women FPC in Gumla. While

aggregation occurred through three partners across multiple locations—Burm (Ranchi), Raidih (Gumla), and Palkot (Gumla)—the sale was processed through PRADAN's nodal FPC to streamline administration and minimise transaction costs. Significantly, collection and aggregation occurred in villages holding CFRR titles, demonstrating the direct linkage between tenure security and economic formalisation.

Each partner brought complementary capabilities: JJBA's deep community trust enabled innovative aggregation approaches, PRADAN's institutional infrastructure provided operational systems, and JSLPS's government connections facilitated administrative coordination. This multi-partner framework demonstrated that direct market linkages can function effectively across diverse implementation models while maintaining quality standards and economic viability.

Critical Insights: The Need for Permanent Institutional Infrastructure

While these pilot sales demonstrated the viability of direct market linkages and generated stable income for participating communities, implementation revealed substantial operational challenges that temporary partnerships could not systematically address (detailed analysis in Section 5).

Engagement with existing FPCs exposed fundamental structural constraints:

- The first constraint was a welfare-oriented mindset, shaped by government agricultural schemes, which created institutional resistance to SFP-centred value chains.
- Decision-making was delayed because of over-reliance on Chief Executive Officers (CEOs) and an inactive Board of Directors (BoD).
- Working capital was insufficient for upfront payments to collectors, which forced reliance on credit models that failed in communities without established trust.
- Quality-assurance requirements were complex and demanded dedicated technical capacity that multi-product agricultural FPCs did not have.
- Weather-related disruptions required adaptive responses, which welfare-focused organisations struggled to implement.

Most critically, these experiences revealed that sustainably scaled market access requires permanent institutional infrastructure specifically designed for the forest economy's unique characteristics. Temporary facilitation and existing agricultural co-operatives, while valuable for piloting, could not provide the

specialised institutional foundation necessary to transform informal SFP collection into a formal, equitable economic sector. This realisation catalysed our strategic shift towards establishing dedicated, women-owned PCs focused exclusively on SFPs. These formalised legal entities are capable of building long-term buyer relationships, accessing formal credit, investing in quality infrastructure, and operating with the business discipline required for commercial viability while maintaining community ownership and sustainable resource management.

4.3.2 Formation of a Women-Owned PC

The 2023–2024 Sal-Seed sales revealed a fundamental gap. These insights informed the establishment of the Sona Buru Jungle Producer Company (SBJPC) in April 2025–Jharkhand's first women-led community enterprise registered under the Companies Act, 2013. The company has three defining characteristics: it focuses exclusively on SFPS; it is wholly women-owned and women-governed; and it has operational autonomy, which enables adaptive market responses without dependence on external facilitators.¹³

Institutional Design

SBJPC spans 57 villages across Simdega district (16 in Kolebira, 27 in Bano, 14 in Jaldega blocks), with 1,008 women shareholders, all of whom are primary collectors of SFPs. The company aims to expand its shareholder base in subsequent phases. The BoD, elected through democratic village-level nominations—ensuring a maximum of one representative per panchayat—exercises autonomous authority over pricing, quality standards, and buyer selection. This governance structure prevents elite capture while ensuring decision-making power remains with primary collectors.

The business model integrates three operational components. First, primary collectors sign agreements committing to sustainable harvesting practices. Second, village-level collection centres implement quality control through shareholder-elected controllers managing moisture testing, grading, and packaging. Third, centralised aggregation enables consolidated transportation to industrial buyers, achieving economies of scale while maintaining traceability from forest to factory gate.

Formation followed a streamlined pathway: high-potential zone identification → democratic leadership selection through community consultations → document collection and Digital Signature Certificate processing → Companies Act

¹³ A comprehensive report detailing the formation of the Producer Company is provided in the annexure.

registration → banking with the State Bank of India, Goods and Services Tax (GST) registration, and Micro, Small and Medium Enterprises (MSME) certification. This sequence minimised bureaucratic delays while establishing formal business credibility.

Institutional Validation: 2025 Inaugural Sale

SBJPC's first transaction demonstrated the model's operational viability. Within three months of incorporation, the company sold 44.464 metric tonnes of Sal seeds to AAKIPL for ₹14,40,000, aggregating across 63 villages through 750 primary collectors, coordinated via CFRMCs and Gram Sabha partnerships. Multiple truckload dispatches to AAKIPL's Raipur facility showcased industrial-scale procurement capacity.

Two elements distinguished this sale from earlier pilot transactions. First, the company established a framework for transferring royalty payments to Gram Sabha accounts for forest management-creating a precedent in which commercial enterprise directly funds community conservation. Second, a partnership with FarMart provided working-capital financing through risk-sharing arrangements, eliminating the upfront payment constraints that had plagued pilot sales while maintaining community control over pricing decisions.

The BoD's autonomous management of logistics, buyer negotiations, and financial operations validated that women collectors possess the capability to lead complex commercial enterprises when provided with appropriate institutional structures. Direct bank transfers to primary collectors, at premium rates above informal market prices, demonstrated tangible value capture, whereas quality protocols implemented by shareholder-elected collectors met industrial specifications without external technical staff.

SBJPC demonstrates that specialised, forest-based PCs can serve as permanent institutional solutions. The company targets high-volume products, including Sal seeds, Harda (*Terminalia chebula*), Behra (*Terminalia bellirica*), and Chironji (*Buchanania lanzan*) across multiple seasons, positioning itself for sustained industrial partnerships. Its legal structure enables multi-year buyer contracts; formal banking relationships facilitate working-capital access; and GST registration provides tax advantages and government scheme eligibility.

SBJPC's inaugural sale (₹12,05,582 from 38.87 tonnes within three months) validates the intervention's income potential. Collectors demonstrate 111-283% annualized average increase in net income-from baseline ₹5,000-18,000 to ₹38,000-50,000 by Year 3-through value retention, quality premiums, and extended earning periods (detailed income impact calculation in Annexure).

4.3.3 Leadership Training for Board Members and Promoters of the Company

Legal incorporation of SBJPC created the institutional infrastructure; activating this structure required systematic capacity building to transform traditional SFP collectors into enterprise managers capable of autonomous operations.

We developed a comprehensive programme preparing shareholders-particularly the BoD and promoters-for post-incorporation operations. Training modules addressed mobilisation strategies for membership expansion, operational planning for seasonal sales, and financial management fundamentals, including pricing, cost accounting, and profit distribution. The pedagogical approach emphasised interactive learning through role-play exercises, group problem-solving, and collaborative strategy development rather than passive instruction.

In March 2025, over 60 women-Board members, promoters, and shareholder representatives from Bano, Kolebira, and Jaldega blocks-gathered at the Bano Panchayat Office for a residential workshop. Participants voluntarily gave up two days of earnings during peak Mahua (*Madhuca longifolia*) collection season to attend the training.

Day one focused on understanding the PC value proposition through comparative analysis. Role-play exercises illustrated the dynamics between PC sales and individual seller transactions, demonstrating collective bargaining advantages. Discussions explored operational differences between Self-Help Groups¹⁴ and Producer Groups¹⁵, clarifying how formal business structures create distinct market positioning.

Day two transitioned to actionable strategy development. The participants mapped shareholder-mobilisation plans across 134 villages, identified local leaders for enrolment drives, and designed communication strategies to explain membership benefits. Most importantly, they designed the 'Sarai Didi' system-designating village-level women aggregators as coordination points for collection and temporary storage in locations lacking CFRMCs. This innovation demonstrated the capacity to adapt institutional models to local realities while building towards formalised operations.

Board members developed detailed operational strategies for the upcoming Sal-seed season, addressing logistics coordination, quality-control protocols,

¹⁴ A Self-Help Group is an affinity-based, homogenous group of typically 10–20 women (minimum 5 in hilly/tribal/difficult areas) formed for savings, credit, and collective action.

¹⁵ A Producer Group is an informal collective of primary producers that works to reduce transaction costs, improve production and market access, and undertake collective activities in a value chain.

communication systems for price announcements, and financial arrangements for timely payments to collectors. This planning process transformed business concepts into concrete operational steps.

The training's effectiveness was evident in SBJPC's subsequent Sal-seed sale, where Board members autonomously managed complex commercial transactions. The programme demonstrates that systematic capacity building—combining technical skills, strategic planning, and confidence building—enables women to transition from informal collectors to formal enterprise leaders, capable of managing scaled commercial operations while maintaining community accountability.

4.4 Leveraging Technology for Transparency and Efficiency

Technology serves as a critical enabler across IoFE's interventions, addressing information asymmetries, operational inefficiencies, and physical drudgery that have historically constrained the forest economy. Our technological approach integrates evidence generation through digital inventory mapping to quantify SFP potential; process innovations that bring scale and efficiency to claim filing and supply chain management; and mechanisation solutions that reduce the physical burden of collection labour. These interventions demonstrate that appropriate technology, designed with community participation and aligned with local context, can simultaneously enhance economic outcomes, improve working conditions, and strengthen transparency across forest-based value chains. The following subsections detail major technological breakthroughs implemented in Jharkhand.

4.4.1 Creation of a Digital Inventory for SFPs of Jharkhand's Forests

Understanding Jharkhand's forest-economy potential required moving beyond anecdotal knowledge to systematic, spatially explicit evidence that quantifies SFP availability. Traditional forest inventories focused exclusively on timber species, rendering non-timber SFPs invisible in official data systems. This information gap hindered evidence-based policymaking, constrained market-linkage negotiations with industrial buyers, and prevented communities from understanding the scale of resources under their potential management.

We developed comprehensive digital inventories for key SFPs (Sal seeds and Bamboo) across Jharkhand's forested landscapes. We combined ground-truth

data collection, satellite-imagery analysis, and machine learning models to produce spatially explicit assessments of SFP distribution, density patterns, and economic potential.

Field teams conducted systematic ground surveys using mobile-based data collection applications (the nCount platform)¹⁶. Survey teams recorded species presence, density measurements, Global Positioning System (GPS) coordinates, and forest stand characteristics across sample plots distributed throughout target districts using grid and cluster sampling approaches. Simultaneously, high-resolution satellite imagery from Sentinel-1, Sentinel-2, and Landsat-8 platforms covering the state's forested areas was obtained. Data-fusion techniques integrated ground-truth information with multi-temporal satellite imagery spanning 2015–2023, creating comprehensive datasets for machine-learning model training.

Modified convolutional neural networks (CNNs) and phenology-based threshold classification methods were employed to map the distributions of SFPs. The phenological approach leveraged Sal's flowering patterns and Bamboo's unique leaf-shedding characteristics, establishing threshold values distinguishing target species from other forest vegetation.

The digital inventory generated spatially explicit distribution maps revealing Jharkhand's substantial SFP endowment. The analysis identified 10,59,500 hectares of Sal forests, with high-density concentrations in southern and western districts, including Simdega, West Singhbhum, Gumla, Ranchi, and Lohardaga. The inventory mapped 3,66,700 hectares of Bamboo forests, with notable concentrations in eastern and northern districts. Spatial analysis revealed strong overlap between high forest-density areas and concentrations of forest-dependent populations, validating that 26% of Jharkhand's population relies on forest resources for their livelihoods. Additionally, the analysis identified 3,17,800 hectares of immediate, high-priority forest-restoration potential, primarily in degraded forest landscapes.¹⁷

The digital inventory's quantitative evidence played a decisive role in high-level political engagement. Presenting spatially explicit data on the forest economy's potential-derived from the sustainable harvesting of SFPs across mapped forests-provided compelling justification for prioritising CFRR recognition and forest-based livelihood programmes. This evidence informed the Chief Minister's decision to launch the ABAD campaign in November 2023, positioning secure

¹⁶ Read more at <https://ncount.in/>

¹⁷ Spatial distribution maps of Sal trees, Bamboo forests, tribal population and SFP distribution, and forest restoration potential are included in the Annexure.

community tenure and forest-based enterprise development as central pillars of the state's economic strategy. The inventory's demonstration that over one quarter of Jharkhand's population depends on forests reframed forest rights from a welfare concern to an economic opportunity, catalysing political commitment to large-scale CFRR recognition.

Parallel to the resource inventory, comprehensive boundary mapping was conducted to address a critical constraint in FRA implementation. FRCs consistently identified the absence of accurate, accessible forest boundary maps as a primary barrier to claim preparation. Using GIS-enabled mobile applications, digital boundary maps were created for forested villages across all 24 districts. These maps, integrated into the JharFRA mobile application (see Section 4.4.2), eliminated this bottleneck. They enabled communities to demarcate their traditional forest areas with precision and submit claims with proper spatial documentation, supporting the ABAD campaign's objective of processing over 10,000 CFRR claims statewide.

4.4.2 Adoption of the JharFRA Mobile Application in the Campaign

We developed RatiFi as part of the ForestFi technology stack supporting transparent forest governance and market linkages, designed to facilitate claim generation while addressing systemic inefficiencies in FRA implementation. Following sustained advocacy with PDAG and senior government leadership—which emphasised technology-driven solutions for tenure security—the Jharkhand government adopted RatiFi in December 2023 under the name 'JharFRA' (a portmanteau of Jharkhand and the FRA). It now serves as the technological backbone for the ABAD campaign¹⁸.

Prior to JharFRA, the CFRR claim process imposed substantial transaction costs due to repeated travel, lengthy delays from manual documentation, and limited transparency in claim tracking. Claimants spent considerable time travelling to obtain documents, track claim progress, and resolve technical issues, such as missing stamps or officials' absence. Manual paperwork made tracing interactions between communities and government departments difficult, leading to lost documents and procedural rejections. Claims stored manually at block offices resulted in disorganised records; many documents were misplaced before reaching the SDLC for approval, frequently forcing communities to restart the entire process.

JharFRA addresses these systemic barriers through integrated technological capabilities. A centralised digital repository functions as an organised vault,

¹⁸ A comprehensive report on JharFRA and its ground-level implementation is provided in the Annexure.

ensuring all claim forms and receipts remain permanently accessible and traceable, thereby eliminating document loss that previously necessitated restarting claims. The application provides claimants with essential pre-filled information, including block details, panchayat information, and supporting government documents. It also enables users to download soft copies of CFRR maps, consolidated land records, evidence documents, and required forms directly from the application-. Community-level forest maps, downloadable for Gram Sabha authentication, integrate topography data from the Survey of India with revenue and forest boundary layers from the Jharkhand Space Applications Centre. These maps standardise map legitimacy across all levels and mitigating boundary conflicts.

The application sends automated alerts to the Forest and Revenue Departments when FRCs initiate field verification. It captures digital receipts as proof and provides real-time claim-status tracking at every stage to foster transparency and accountability. The SDLC can return feedback via platform-based comments to FRCs, streamlining issue resolution. Offline functionality enables users to complete claim forms without internet connectivity, with automatic synchronisation once a connection becomes available-critical for Jharkhand's remote villages with limited cellular coverage.

JharFRA is designed exclusively for primary stakeholders directly involved in claim filing: FRCs (claimants), SDLCs, the District Level Committee (DLC)¹⁹, and the State Level Monitoring Committee (monitoring only). A smart logic engine monitors claim filings and approvals across all three requisite levels, ensuring procedural compliance with the FRA requirements. The application workflow varies by user type, with FRCs preparing claims on behalf of Gram Sabhas, initiating field verification with automated notifications, and submitting finalised claims to SDLCs. Forest Range Officers and Revenue Officers conduct field verification through the application, compile reports, and forward recommendations. The SDLCs and DLCs review claims digitally, provide feedback through the platform, and process approvals-all actions tracked and time-stamped for accountability.

As of October 2025, JharFRA has 4,310 active users including FRCs, SDLCs, and DLCs across Jharkhand. The platform has been customised for use across all 24 districts. A comprehensive Management Information System dashboard provides government officials with district-wise distribution of registrations, CFRR claim filings, village-level coverage, application form submissions, and claimed areas, with access granted to District Collectors, the Tribal Welfare Commissioner, and other officials involved in CFRR claim filing.

¹⁹ The DLC is constituted by the state government under the FRA and chaired by the District Collector. It approves valid claims and issues titles.

The Government of Jharkhand issued a Standard Operating Procedure (SoP) booklet of JharFRA's use for claim filings, field verification, and SDLC/DLC approvals, establishing the legal foundation for large-scale implementation. This government endorsement transformed JharFRA from pilot technology to official state infrastructure for FRA implementation, distinguishing it from project-based interventions lacking institutional permanence.

4.4.3 Development of Sulabhaa ArthaSakhi for Traceability

Supply-chain traceability represents a critical gap in forest-based value chains, with first-mile invisibility preventing verification of sustainable-sourcing claims and excluding communities from premium markets requiring responsible-sourcing documentation. To address this constraint, we are developing, Sulabhaa ArthaSakhi²⁰, an Android-based mobile application that digitises SFP transactions through blockchain-based verification.

The application enables PC representatives to create digital purchase orders, onboard primary collectors through structured registration processes, and execute transactions with automatic blockchain recording. Each transaction generates verifiable digital receipts with Quick Response (QR) codes, creating immutable audit trails from forest collection to formal market entry. This technology addresses multiple barriers simultaneously: collectors gain verifiable income documentation that facilitates formal credit access; PCs obtain proof of sustainable sourcing for certification requirements; and industrial buyers receive traceable supply-chain verification that meets responsible sourcing standards.

The application is currently under development, with comprehensive testing underway, prior to deployment across operational PCs in Jharkhand, Odisha, and Himachal Pradesh.

4.4.4 Testing of the Sal-Seed Collector Machine for Mechanisation

The physical burden of sal-seed collection represents one of the most visible manifestations of drudgery in Jharkhand's forest economy. Women collectors spend 6–8 hours daily manually gathering seeds from forest floors, carrying 15–20 kg loads over distances up to 10 km in the scorching heat. This backbreaking labour, combined with the compressed six-week collection season (May to early July), creates severe physical strain while limiting economic returns. Despite Jharkhand's 10,59,500 hectares of Sal forests identified through digital inventory mapping, only 10–15% of available seeds are harvested annually. This shortfall is partly explained by the labour-intensive nature of collection, which makes the activity economically marginal for many households.

²⁰ A comprehensive presentation deck on Sulabhaa ArthaSakhi is provided in the Annexure.

Mechanisation offers the potential to simultaneously reduce physical drudgery and increase collection efficiency, enabling women to harvest greater volumes within the limited seasonal window. However, forest-based mechanisation presents distinct challenges compared to agricultural mechanisation: uneven terrain; scattered seed distribution; debris-laden forest floors; and the need for affordable, locally maintainable equipment that women collectors can operate independently.

loFE partnered with the Indian Institute of Technology (IIT), Delhi, to develop a Sal-seed collector machine specifically designed for forest floor conditions and women collectors' operational requirements. The manually operated device employs a pinion-and-gear-wheel system that sweeps fallen seeds into an attached collection bag, as users push it across the forest floor. This design prioritises simplicity, affordability, and ease of operation-critical factors for adoption among communities with limited access to complex machinery or maintenance infrastructure. The machine addresses two fundamental constraints simultaneously. First, it reduces the physical strain of bending repeatedly to collect seeds by hand. Second, it increases the collection speed to enable larger-volume harvesting during the compressed seasonal window before monsoon rains damage fallen seeds.

Following laboratory development, the machine underwent rigorous field testing across Gumla, Simdega, and Ranchi districts under the supervision of IIT Delhi. Testing occurred during the 2024 sal seed season, with women collectors from villages holding Community Forest Resource Rights titles operating the machines in actual collection conditions. Field trials demonstrated significant efficiency gains, with collectors using the machine gathering over 5.5 kg of seeds per hour—a 33% increase compared to manual collection methods. This productivity improvement enables women to potentially double their daily collection volumes, substantially increasing earnings during the short seasonal window. Additionally, faster aggregation reduces post-harvest losses from moisture damage when unexpected rainfall occurs before the official monsoon onset.

Pilot testing revealed several technical limitations requiring design refinement before scaled deployment. The current mechanism collects dry leaves, twigs, and other forest floor debris along with Sal seeds, requiring additional manual segregation effort post-collection. The machine performs optimally on relatively flat forest floors but struggles on hilly terrain-common in Jharkhand's forested landscapes-with steep slopes and rocky surfaces reducing operational effectiveness. Users also reported difficulty maneuvering the machine around tree trunks, dense undergrowth, and uneven surfaces, limiting its effectiveness in certain forest stand configurations. Based on collector feedback, loFE is

coordinating with IIT Delhi on several design improvements: a refined separation mechanism to filter unwanted debris during collection, stronger wheels with improved tread patterns and better weight distribution for stability on uneven surfaces, and exploration of lightweight solar-powered suction technology to increase collection efficiency while maintaining affordability.

Following completion of design refinements based on pilot testing feedback, loFE plans coordinated deployment across PCs in Jharkhand. The mechanisation strategy prioritises community enterprise ownership rather than individual purchase-enabling PCs to acquire machines as shared assets available to shareholders, reducing individual capital requirements while ensuring maintenance capacity through trained operators. The sal seed collector machine demonstrates loFE's integrated technological approach-deploying innovations that reduce drudgery, improve efficiency, and formalise value chains while maintaining community ownership and control over forest resources and commercial operations.

5. Key Challenges and Learnings

Implementation generated fundamental insights that shaped our approach. Most critically, specialised institutional infrastructure purpose-built for the forest economy outperforms repurposed agricultural co-operatives: welfare-oriented FPCs, marked by decision-making delays and capital constraints, could not provide the operational agility required for SFPs. The formation of SBJPC validated that dedicated, women-owned, forest-based enterprises provide a permanent institutional foundation necessary for scaled market access.

Environmental disruptions, entrenched trader networks, limited banking system familiarity, and infrastructure deficits required adaptive responses: flexible operational planning, transparency mechanisms with verified payments, strategic partnerships to address specific constraints, and sustained, multi-level government engagement. Initial training models that relied on intermediaries proved ineffective; direct engagement with FRCs, through targeted training and multi-channel support systems, significantly improved outcomes. Piloting four delivery models showed that vehicle-based distribution paired with helpdesks is optimal for last-mile resource delivery.

These experiences demonstrate that transformation requires integrated interventions-tenure security, specialised enterprises, appropriate technology, and market access-working synergistically rather than in isolation. Community ownership and women's leadership constitute non-negotiable design principles. Adaptive implementation through iterative piloting is essential, as is political commitment at the highest levels, complemented by robust ground-level capacity and durable institutional mechanisms that outlast individual political tenures.

6. Way Forward: Pilot to Scale

Building on demonstrated successes in pilot districts, we will now scale interventions statewide through a strategic partnership with SIDHKOFED. Our sustained advocacy culminated in state leadership launching the ABAD campaign and adopting the JharFRA application for secure digital claim processing and permanent traceability. We will aim to saturate CFRR potential across approximately 10,000 villages, covering 5.5 million (55 lakh) acres of forest land, thereby creating the foundational tenure security necessary for economic formalisation.

On this foundation, we will establish 70 women-owned PCs with 2,00,000 women shareholders across Jharkhand. These enterprises will be supported by integrated technology systems, including mobile applications for transparent transactions, blockchain-enabled traceability through Sulabhaa ArthaSakhi, geospatial analytics for forest inventory, mechanisation (including the refined sal-seed collector machine), and digital financial systems. Women will receive continuous training in governance, business management, and entrepreneurship, transforming invisible labour into recognised, women-led green businesses-enabling a shift from subsistence livelihoods to formal business ownership at scale.

This intervention will directly serve 2,00,000 women shareholders and generate 2,500 direct jobs in company management, processing, quality control, and logistics, alongside 5,000 indirect jobs in transportation, packaging, and ancillary services. In total, 2,09,500 people will be directly impacted. This will transform Jharkhand's forest-dependent communities from economically invisible labourers into recognised business owners and formal economic actors, with legal identity, market access, and pathways to sustainable prosperity.

Annexure-1: Income Impact Calculation

Baseline and Endline Income Data

Metric	Amount (₹)
Baseline annual income (before intervention)	5,000 - 18,000
Year 3 projected annual income	38,000 - 50,000
Average baseline	11,500
Average Year 3	44,000

Percentage Increase Calculation

Formula: $[(\text{Year 3 Income} - \text{Baseline Income}) / \text{Baseline Income}] \times 100$

Scenario	Calculation	Result
Conservative (₹18,000 → ₹38,000)	$(38,000 - 18,000) / 18,000 \times 100$	111%
Average (₹11,500 → ₹44,000)	$(44,000 - 11,500) / 11,500 \times 100$	283%

This represents a 2-10x increase in annual income from seasonal forest product collection.

Mechanisms Driving Income Increase: Rationale

Women collectors currently receive only a small fraction of the final market value of forest products because they operate individually in informal markets. Most of the value leaks to intermediaries, spoilage, and inefficiencies. Producer Companies capture this lost value through four key mechanisms:

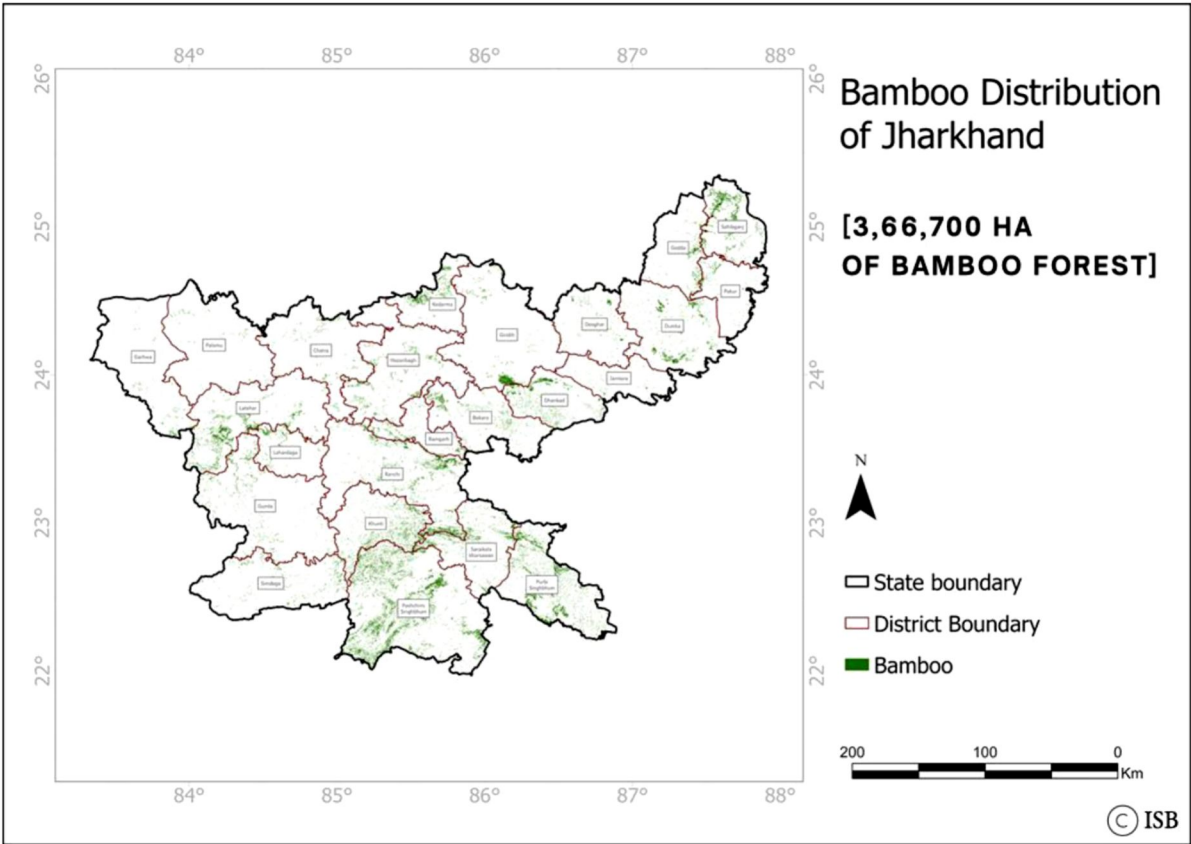
- 1. REDUCING SFP VALUE LOSS:** In informal systems, a significant portion of collected forest products spoils due to rain exposure, improper drying, and inadequate storage. Women lose a substantial part of their labor value before products even reach the market. PCs provide weatherproof drying yards, proper storage facilities, and quality grading systems that dramatically reduce value loss from Year 1 to Year 3.
- 2. ELIMINATING INTERMEDIARY MARGINS:** Women sell to local traders at heavily discounted prices because they lack market information, cannot meet bulk order requirements, face immediate cash needs that force distress sales, and have no bargaining power as individual sellers. PCs aggregate volumes to enable direct

sales to industrial buyers, establish formal purchase agreements that eliminate distress pricing, ensure transparent market-based pricing, and provide working capital support. Direct industrial linkages steadily improve prices as PCs establish themselves and build buyer relationships.

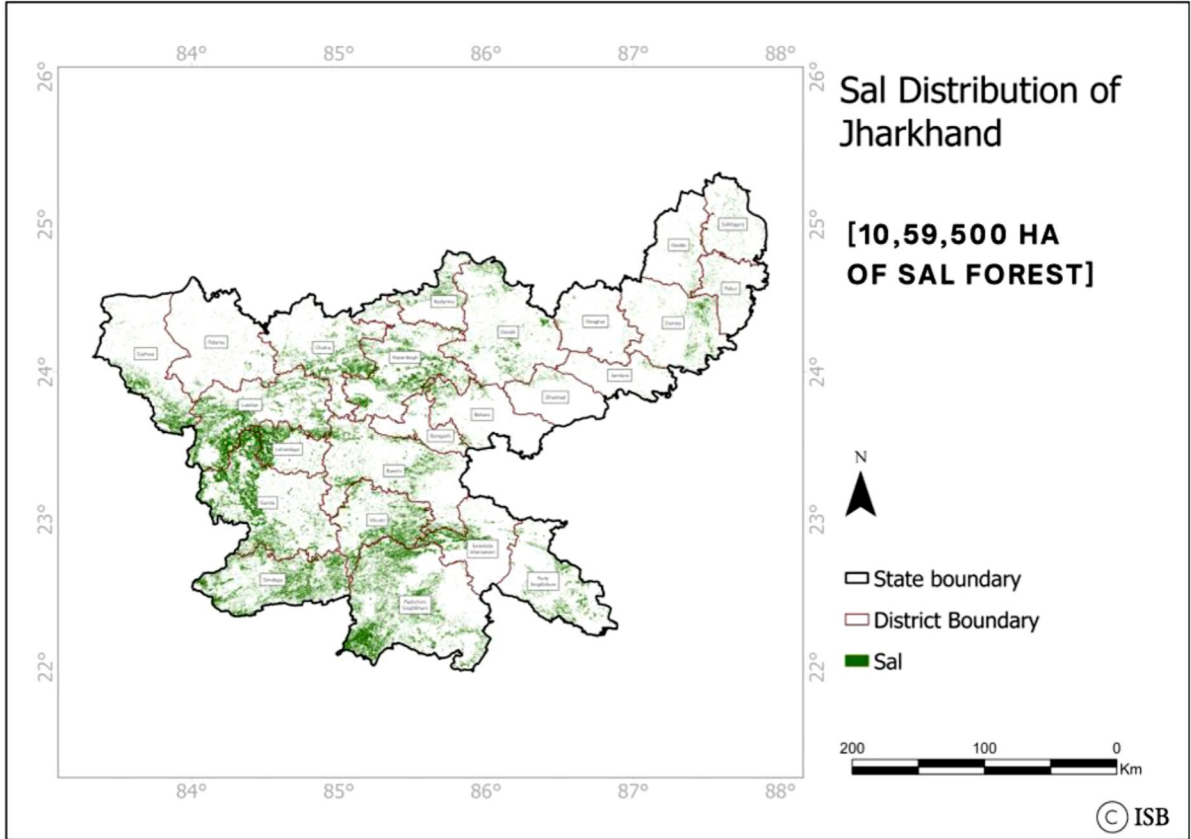
- 3. EXTENDING EARNING PERIODS:** Individual collectors typically focus on one or two high-volume products available for short seasonal windows, limiting their total earning period to just a few months each year. By aggregating demand across multiple forest products - mahua flowers and seeds, karanj seeds, chironji, harda, amla, beheda, and bamboo - PCs create near-continuous collection opportunities throughout the year. As PCs mature and add more products to their portfolio, women work substantially more months each year for better returns per day of work.

- 4. ACHIEVING SCALE-DRIVEN PRICE IMPROVEMENTS:** Small volumes fetch lower prices. Individual collectors or small communities cannot meet minimum order quantities for industrial buyers, obtain quality certifications, secure advance purchase agreements, access credit for working capital, or command grade-based pricing. PCs aggregate volumes across hundreds of collectors to create supplier market power, maintain consistent quality standards that enable certifications, build multi-year track records that create buyer confidence, and attract competition among multiple buyers. Established PCs command premiums through certifications, long-term buyer relationships, and reputation for quality and consistency.

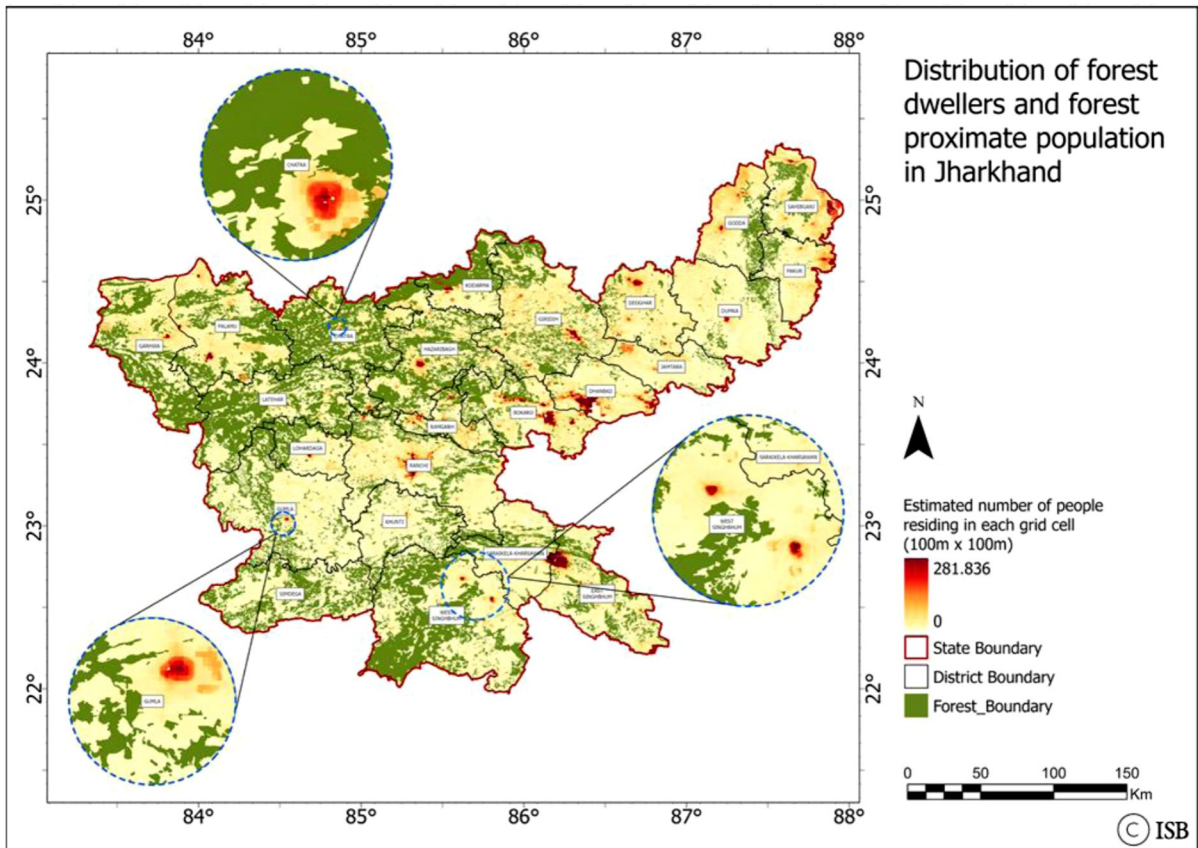
Annexure-2



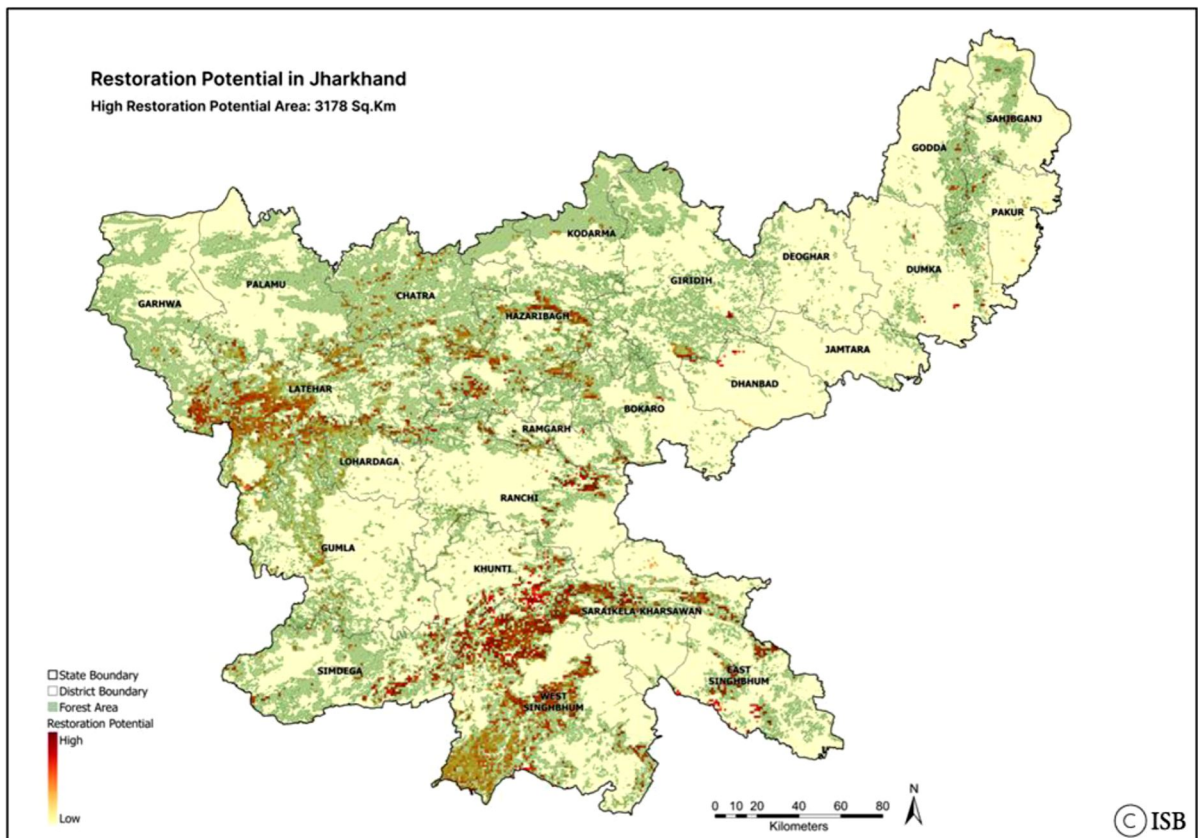
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*We are always open to partnerships,
ideas, and conversations.*

*Reach out to explore collaboration or
to learn more about our work.*

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