

Seeding Change Across Bodoland's Ruralscapes

A Compendium of Best Practices
from the Stakeholders of the Bodoland
Bioregional Collaborative

:: First Edition ::



FOREWORD

India's rural transformation cannot be understood through isolated programmes. It is shaped by the interplay of Samaj, Sarkar, and Bazaar communities, and public systems - evolving together over time. As rural India confronts the dual imperatives of multidimensional poverty and the emergent climate crisis, our greatest challenge is not always the absence of solutions, but our ability to recognise, learn from, and collectively build upon what works.

Meaningful impact cannot emerge from sectoral silos; it demands a whole-of-society, whole-of-economy, and whole-of-ecology approach. The climate crisis has made collective action an urgent imperative—a truth starkly reinforced by this year's devastating floods across Assam, underscoring why the broader region, including Bodoland, is ranked among the most climate-vulnerable in the country.

As a multi-actor platform holding together a bioregion of agroecological, cultural, and socioeconomic contiguity, the Bodoland Bioregional Collaborative is an effort towards place-based transformation by way of shared visioning, institution-building, and partnerships that place communities aspired vision of the place, one that would nurture both people and the nature.

This compendium acknowledges and amplifies impactful solutions with strong potential for scale. While scaling requires deliberate effort and a different set of strategies in aligning public systems, markets, and civil society—these documented practices serve as vital stepping stones. Their true value lies not in offering rigid templates, but in expanding our collective understanding of how to nudge rural ecosystems toward lasting, positive transformation.

At Transform Rural India, we believe that practice-based knowledge is a public good. Sharing these insights strengthens the broader rural development ecosystem - enabling practitioners, policymakers, researchers, philanthropies, Government and community platforms to learn from one another and act with purpose.

I hope this volume inspires deeper reflection, informed action, and a renewed commitment to collective action placing rural communities at the heart of India's development journey.



Anirban Ghose,

Co-lead, TRI

ACKNOWLEDGEMENT

Here is the revised text with the requested line seamlessly integrated into the second paragraph:

This compendium has been made possible through the generous cooperation and support of numerous individuals, communities, and organisations.

Sincere appreciation is extended to all participating organisations for their invaluable contributions towards rural development and for their willingness to share their experiences, knowledge, and learning. Gratitude is expressed for the support extended during field visits, the information and documentation provided, and the time dedicated to interviews and discussions. The organisations are acknowledged: Ayanant Ventures Pvt. Ltd., Centre for Microfinance and Livelihood, Gramya Vikash Mancha, KABIL, Seven Sisters Development Assistance, Tamul Plates Pvt. Ltd., The Midway Journey, and World Wide Fund for Nature, India. While the commendable best practices of several other organisations could not be captured in this volume, we deeply value their work and look forward to documenting their initiatives in a subsequent phase.

Heartfelt thanks to the community members, frontline staff, and field teams who generously shared their experiences and insights, making it possible to authentically document the realities, processes, and outcomes of these initiatives.

Special acknowledgement is due to Mr. Arpon Kumar Bhattacharjee (TRI), for conceptualising this compendium, fostering collaborations with partner organisations, recognising the value of documenting these practices, and providing constant guidance, logistical support, and thoughtful inputs throughout the process.

The field research, documentation, analysis, and compilation of this compendium were undertaken by Ms. Rakhee Sharma (TRI), whose dedicated efforts brought together the diverse experiences presented in this volume.

INTRODUCTION

Every village has a story of change.

Some stories are visible, in restored landscapes, thriving community enterprises, strengthened local institutions, improved public services, or enhanced livelihoods. Others unfold more quietly, through shifts in trust, collective action, leadership, and the confidence of communities to shape their own development. Yet many of these experiences remain confined to project reports, organisational memory, or local contexts, limiting opportunities for learning, adaptation, and replication.

This compendium seeks to bridge that gap, bringing together a carefully curated collection of development initiatives implemented by civil society organisations, government agencies, community institutions, and development partners across the Bodoland Bioregional Landscape. Although diverse in their themes, from water security and sustainable agriculture to livelihoods, women's empowerment, governance, renewable energy, and natural resource management, they collectively demonstrate a common principle: sustainable rural transformation is rarely the product of a single intervention. It emerges through the convergence of institutions, knowledge, community participation, and long-term commitment.

This publication deliberately moves beyond documenting *what* was done to examining *how* change occurred. Each case has therefore been analysed through a common framework encompassing five interrelated dimensions—Institutional, Technical, Social, Ecological Sustainability, and Innovation. This structure allows readers to understand not only the interventions themselves, but also the enabling conditions, implementation processes, governance mechanisms, challenges, and factors influencing scalability and long-term sustainability.

Equally important, the compendium does not present development as a collection of perfect success stories. Wherever possible, it acknowledges implementation constraints, contextual limitations, evidence gaps, and the trade-offs inherent in real-world practice. By documenting both achievements and challenges, it seeks to promote critical reflection rather than simple replication.

The Bodoland Bioregional Landscape offers a compelling setting for these lessons. Rich in ecological diversity and cultural heritage, yet marked by complex developmental challenges, it demonstrates how locally rooted institutions, responsive governance, and community leadership can address interconnected social, economic, and environmental issues through integrated approaches.

Ultimately, this compendium is more than a repository of best practices. It is an invitation to learn from practice, strengthen collaboration, and reimagine rural development through systems thinking and community ownership. We hope these experiences will encourage dialogue, inspire collaboration, and support practitioners and policymakers in designing context-sensitive, community-centred approaches to rural transformation. Above all, we hope they reaffirm a simple but powerful idea: that rural flourishing is achieved not by delivering development *to* communities, but by creating the conditions through which communities can lead their own development.

Table of Contents:

1	Guardians of Water: Strengthening Drinking Water Safety Through Community Ownership in Balitara No. 1	Centre For Microfinance & Livelihood [CML]	1
2	From Water Scarcity to Water Governance: Convergence-Led Rural Transformation in Baltipar, Tamulpur	Gramya Vikash Mancha [GVM]	11
3	From Individual Farmers to Production Clusters: Strengthening Rural Livelihoods through the Agri & Allied Production Cluster (AAPC) Model in Baksa District	SeSTA	24
4	Building an Inclusive Rural Enterprise Ecosystem through Arecanut Leaf Value Chains	Tamul Plates	41
5	Strengthening Last-Mile Livestock Service Delivery through a Community-Owned Enterprise in Bechimari, Assam	Ayanant Ventures Private Limited	54
6	From Waterlogged Land to Productive Livelihoods: Leveraging MGNREGA Farm Ponds for Rural Diversification in Udalguri	KABIL	65
7	From Waste Collection to Waste Governance: Building Community and Institutional Responsibility in the Eco-Sensitive Landscape of Barengabari, Manas National Park	The Midway Journey	77
8	Building Community Institutions for Conservation and Rural Resilience in the Nameri Landscape	WWF India	90

Guardians of Water: Strengthening Drinking Water Safety Through Community Ownership in Balitara No. 1

Executive Summary

Despite the presence of a Jal Jeevan Mission (JJM) water supply system, many villages in Assam's Nalbari district continued to face concerns regarding drinking water safety. Field investigations conducted by the Centre for Microfinance and Livelihood (CML), revealed arsenic concentrations ranging from **15 ppb to as high as 250 ppb** in certain locations (*Khatkhtra* village), substantially exceeding the Bureau of Indian Standards (BIS) **permissible limit of 10 ppb** and reinforcing the need for both technical treatment and community awareness regarding safe water use. In response, CML with support from Tata Trusts, integrated Arsenic and Iron Removal Plants (AIRP) with the existing JJM infrastructure and strengthened community ownership through women-led water quality monitoring, awareness generation, and local governance mechanisms. The intervention improved confidence in treated drinking water and demonstrates how community participation can strengthen the effectiveness and sustainability of rural water supply systems.

Context and Development Challenge

Balitara No. 1 is a village of approximately 2,811 residents and 240 households in Nalbari district of Assam, located near the Pagladiya River, a tributary of the Brahmaputra. The area's geological characteristics contribute to naturally occurring arsenic contamination, with the weathering and dissolution of arseno-pyrite resulting in arsenic leaching into groundwater aquifers.

Although the village had a piped water supply system (PWSS) in place under the JJM, many households continued to rely on alternative water sources because of long-standing behavioural preferences, concerns regarding the taste and smell of chlorinated water, and scepticism towards treated water. This creates a long-term water safety challenge that cannot be addressed through behaviour change or infrastructure provision alone. The consequences were profound. Waterborne diseases were widespread. Families routinely visited medical centres for stomach ailments and diarrhoea, unaware that their water supply was the primary issue.

A health camp organised by CML revealed a range of health concerns within the community, including two cases of pancreatic cancer, three cases of dental caries, and several other conditions requiring medical attention. Water quality testing conducted through National Accreditation Board for Testing and Calibration Laboratories (NABL)-accredited laboratories confirmed elevated arsenic levels in local water sources. While no direct causal relationship between these conditions and arsenic exposure was established through the screenings, the findings reinforced concerns regarding water safety and the need for greater community awareness. The village therefore faced a challenge that extended beyond infrastructure provision.

Key Problem Indicators at Baseline

- 2,811 residents; 240 households dependent on untested, unprotected water sources
- Elevated arsenic levels confirmed by NABL-accredited laboratory testing
- Widespread waterborne diseases: diarrhoea, stomach ailments, chronic fatigue
- 2 cases of pancreatic cancer identified during health screening
- 3 cases of dental caries and multiple other arsenic-linked conditions
- Cultural resistance to JJM piped water due to chlorine taste
- No community capacity for water quality monitoring

Intervention Design and Approach

Recognising that infrastructure alone could not address the problem, CML, with support from Tata Trusts, adopted a multi-dimensional approach that combined public health outreach, technical intervention, community mobilisation, local capacity building, and institutional strengthening.

The intervention was built on three complementary pillars: Evidence-Based Awareness and Health Outreach, Strengthening Existing Public Infrastructure, and Building Community Capacity for Water Governance.

Health Outreach as the Entry Point

The intervention began with community engagement rather than infrastructure. Through meetings and awareness activities, CML initiated conversations on water quality, health, and sanitation, laying the foundation for behavioural change. The health camp served as a critical entry point, bringing together medical professionals from Nalbari Medical College, Barpeta Cancer Centre, and district health institutions at the Balitara Mini Primary Health Centre (MPHC). In doing so, it fostered an unprecedented convergence of stakeholders who had not previously collaborated, creating a shared platform to address community health and water-related challenges.

For many villagers, these interactions created the first opportunity to connect everyday water-use practices with broader health concerns. 110 residents came forward for screening medicines for the required patients. Rather than presenting water safety as a technical issue, the intervention framed it as a matter directly linked to household well-being.

"When people could see the test results with their own eyes, everything changed. We weren't just telling them their water was unsafe, we were showing them proof."



Figure 1 FTK Group doing water sample test

— Himani Majumdar, FTK Group Member

Water Quality Testing & Infrastructure

CML coordinated with NABL-accredited laboratories of Assam, and conducted water testing to identify the accurate results. Community members walked researchers to wells they had dug with their own hands, showed them spots where children played near water, and pointed to taps that tasted 'different.' Every positive test result confirmed elevated arsenic levels demanding immediate action. With permission from

the Public Health Engineering Department (PHED) Nalbari, CML Installed AIRP with the existing JJM pipeline infrastructure — ensuring that every drop of water would be treated at source before reaching homes.

Women-Led Monitoring: The Field-Testing Kit (FTK) Group

Five women — Dalimi Rajbongshi, Himani Majumdar, Rumi Rajbongshi, Champa Kalita, and Babita Medhi identified under the JJM framework were trained in the use of FTKs by government functionaries provided by PHED, Govt. of Assam, and supported by CML's cluster coordinators. Their role extended beyond water testing. Through demonstrations, awareness activities and



Figure 2 Dalimi Rajbongshi Showing Iron Test result with chart

regular interaction with households, they became local resource persons on drinking water safety.

The FTK group helped bridge the gap between technical systems and community understanding. By conducting visible water testing and explaining the results, they transformed water quality monitoring from an external activity into a locally embedded practice.

Implementation Mechanism

The implementation unfolded in four overlapping phases, each reinforcing the next to create a self-sustaining system of community ownership, technical competence, and institutional recognition.

Phase 1: Breaking the Silence

The FTK group along with CML team conducted meetings in Balitara, spreading the awareness of Water, Health etc. Undeterred by initial discussions, many villagers questioned why they needed to change habits their families had maintained for generations. The CML team, along with the FTK group demonstrated with evidence: on-the-spot water testing that made contamination visible, tangible, and undeniable.

This hands-on approach gradually dispelled doubts and sparked a newfound awareness, gradually winning over the mindset of people regarding water.

"Initially, people weren't receptive. They didn't understand why they needed to change their water habits when they'd been using the same sources for generations."

— Dalimi Rajbongshi, FTK Group Leader

Phase 2: Infrastructure Integration

With evidence of contamination established, the focus shifted towards ensuring safe water delivery. Rather than creating a separate water supply system, CML worked with PHED to integrate an AIRP with the existing JJM infrastructure. This ensured that water supplied through the piped network was treated before reaching households.

Additional portable Arsenic removal water filters were installed at Balitara High School to ensure access to safe drinking water beyond JJM operational hours. Similar filters were also provided to vulnerable households that were still awaiting complete connectivity under the piped water

supply system.

Simultaneously, the pump operator and Water Users Committee (WUC) members were trained on operation and maintenance by engineers from CML helping build local technical capacity for managing the system.

Phase 3: Community Ownership & Self-Financing

This phase focused on ensuring that the system would remain functional beyond the period of external support.

Through regular discussions facilitated by CML, households collectively agreed to contribute ₹50 per month towards the operation and maintenance of the water supply system. Responsibility for managing these contributions was assumed by the WUC. The committee emerged as an important local institution responsible for financial oversight, maintenance planning and collective decision-making regarding the future of the system.

Through this process, water safety became a shared community responsibility rather than the sole responsibility of government agencies or external organisations.

"Water is life. By protecting our water, we're protecting our future generations. That's a responsibility we take very seriously."

— **Babita Medhi, FTK Group Member**

Phase 4: Recognition & Formalisation

JJM in Nalbari acknowledged the women's outstanding contributions by providing advanced training and certification. This formal recognition transformed a voluntary initiative into a sustainable, institutionally anchored, community-led movement with legitimacy beyond the village boundaries.

Outcomes and Observable Changes

Health Outcomes

Within one year of CML's intervention, and the FTK group's sustained efforts, Balitara No. 1 witnessed a dramatic decrease in waterborne diseases.

- Significant reduction in illness episodes across the village
- Improved overall health and well-being reported by households
- Families that regularly visited medical centres for stomach ailments and diarrhoea reported notable health improvements
- Reduced household expenditure on medicine, and the savings were reportedly redirected to children's education

"My children used to fall sick every few weeks. Since we started following the water safety practices

taught by the FTK group, they've been much healthier. We spend less on medicine and more on education now."

— Junu Medhi, Village Resident

Water Access & Quality

Treated water now flows from Balitara's taps with confidence. The AIRP, integrated with the JJM pipeline, ensures arsenic and iron contamination is addressed at source. Children no longer ration their thirst. Mothers no longer double-boil water out of worry. The village has transitioned from a community that feared its own water to one that monitors and protects it.

"We are now aware of how water can carry diseases. We are drinking safe water, and we feel confident that the system will keep working because we are taking care of it ourselves."

— Minati Devi, WUC member

Community Capacity building

The 5 identified women received training and capacity building support to evolve into extraordinary water protectors. Today these empowered community members:

- Conduct regular water quality checks of the PWS system and household-supplied water
- Maintain meticulous records, tracking progress and identifying areas for improvement
- Collaborate seamlessly with local authorities, ensuring prompt resolution of issues
- Run ongoing awareness sessions educating fellow villagers on water safety practices

"We never imagined we could make such a difference. We were just ordinary women concerned about our families' health. Now we're helping secure the future of our entire community."

— Champa Kalita, FTK Group Member

Financial Sustainability

The ₹50-per-household monthly contribution model generates sufficient revenue to sustain routine operation and maintenance costs. Transparent financial management by the WUC has strengthened community trust, ensuring that both system upkeep and health monitoring remain community-owned and locally managed, without reliance on external funding for day-to-day operations.

Assessment Across Analytical Dimensions

Following the framework's conceptual structure, the Balitara No. 1 intervention is assessed across five analytical dimensions and their interactions:

Institutional Dimensions	The intervention created a layered institutional architecture: The FTK group functions as a frontline monitoring body;
---------------------------------	--



	the WUC governs finances and maintenance; and both operate in coordination with PHED Nalbari. Community action is embedded within, and formally supported by government structures, not operating in parallel to them. JJM certification of the FTK women provides the group with official legitimacy and a structured escalation pathway for unresolved issues.
 Technical Dimensions	The AIRP is a technically appropriate solution for the arsenic-prone Brahmaputra basin region, seamlessly integrated with existing JJM infrastructure to avoid duplication. FTKs democratise water quality monitoring, placing scientific instruments in the hands of trained community members. Supplementary filters at the school and in vulnerable households address last-mile coverage gaps, demonstrating a nuanced understanding of infrastructure limitations. Operation & Maintenance training ensures technical sustainability beyond the installation phase.
Social Dimensions	The intervention is built on deliberate gender empowerment objectives. Selecting and intensively training five women who are members of a social group traditionally excluded from technical and governance roles, created change agents who hold both community credibility and formal institutional recognition. The door-to-door approach, peer-learning model, and participatory testing method ensured social inclusion, reaching all 240 households. Behavioural change was achieved not through instruction but through visible evidence — a communication approach that respected community intelligence and agency.
 Innovation	The intervention's core innovation lies not in the technology but in the model. Operating within the formal JJM framework is a distinctive combination rarely implemented at the village level. The spontaneous emergence of a self-financing model (₹50/household/month) without external prompting represents social innovation. The use of on-the-spot visible testing as a behaviour-change communication tool converting sceptics through evidence rather than advocacy, is a replicable and scalable innovation in community engagement.
Ecological Sustainability	Ecological sustainability was not an explicit objective of the

Dimensions	intervention. Nevertheless, the initiative contributes indirectly to responsible management of drinking water resources by promoting safe water practices and strengthening local stewardship of water systems. Given the intervention's primary focus on public health and drinking water governance, ecological outcomes should be viewed as secondary rather than central achievements.
-------------------	--

Together, these five dimensions create a self-reinforcing model: technical credibility (AIRP and FTK) generates social trust; social trust facilitates institutional integration; institutional integration advances ecological sustainability; and community financing provides the foundation for long-term sustainability across the system.

Scalability and Replicability Potential

The Balitara No. 1 model has already demonstrated its replication potential. The model is being studied as an example for other rural communities facing water safety challenges across the Brahmaputra basin region.

Factors Supporting Scalability

- Modular design: AIRP + FTK Group + WUC can be replicated in any village with JJM infrastructure
- Low external dependency: ₹20-50/household/month community financing model makes routine operations self-sustaining
- Institutional replicability: JJM certification framework provides a standardised pathway for FTK training and formal validation
- Gender-forward model: applicable across rural Assam where women are the primary managers of household water
- Technology fit: AIRP is appropriate for the arsenic-prone Brahmaputra basin, and highly relevant across Nalbari and neighbouring districts
- Evidence-based behaviour change: the on-the-spot testing method can convert community sceptics in any comparable context

Key Insights, and Constraints

What Worked	Limitations & Considerations
• Evidence before advocacy: on-the-spot contamination testing turned sceptics into advocates more	• Sustained social cohesion required: the community financing model depends on continued trust and collective motivation.

effectively than any campaign.

- Integration over addition: embedding the AIRP within JJM infrastructure ensured institutional durability and avoided duplication.
- Trusting communities as problem-solvers: treating residents as capable agents generated ownership no external mandate could.
- Women as change agents: selecting and training women created socially embedded, highly motivated, and credible guardians.
- Multi-sector collaboration: convergence of medical, environmental, and governance actors in one intervention created powerful synergy.
- Organic financing: the spontaneous ₹50 contribution model shows communities will invest when they feel genuine ownership.

- Technical servicing gap: AIRP systems require periodic expert maintenance beyond community capacity.
- Residual coverage gaps: households not yet fully on JJM pipeline remain at risk despite supplementary filters.
- Data collection: more rigorous baseline and endline health data would strengthen the evidence base for scale-up advocacy.
- Leadership sustainability: the FTK group's motivation must be continuously nurtured to prevent fatigue over the long term.
- Arsenic-specific context: the AIRP component is most directly scalable within the arsenic-prone Brahmaputra basin geography.

Conclusion

The experience of Balitara No. 1 demonstrates that safe drinking water outcomes depend on more than infrastructure alone. Although the village already had access to a Jal Jeevan Mission water supply system, concerns regarding water quality, trust, and utilisation limited its effectiveness. The challenge was therefore not simply technical; it was equally social, behavioural, and institutional.

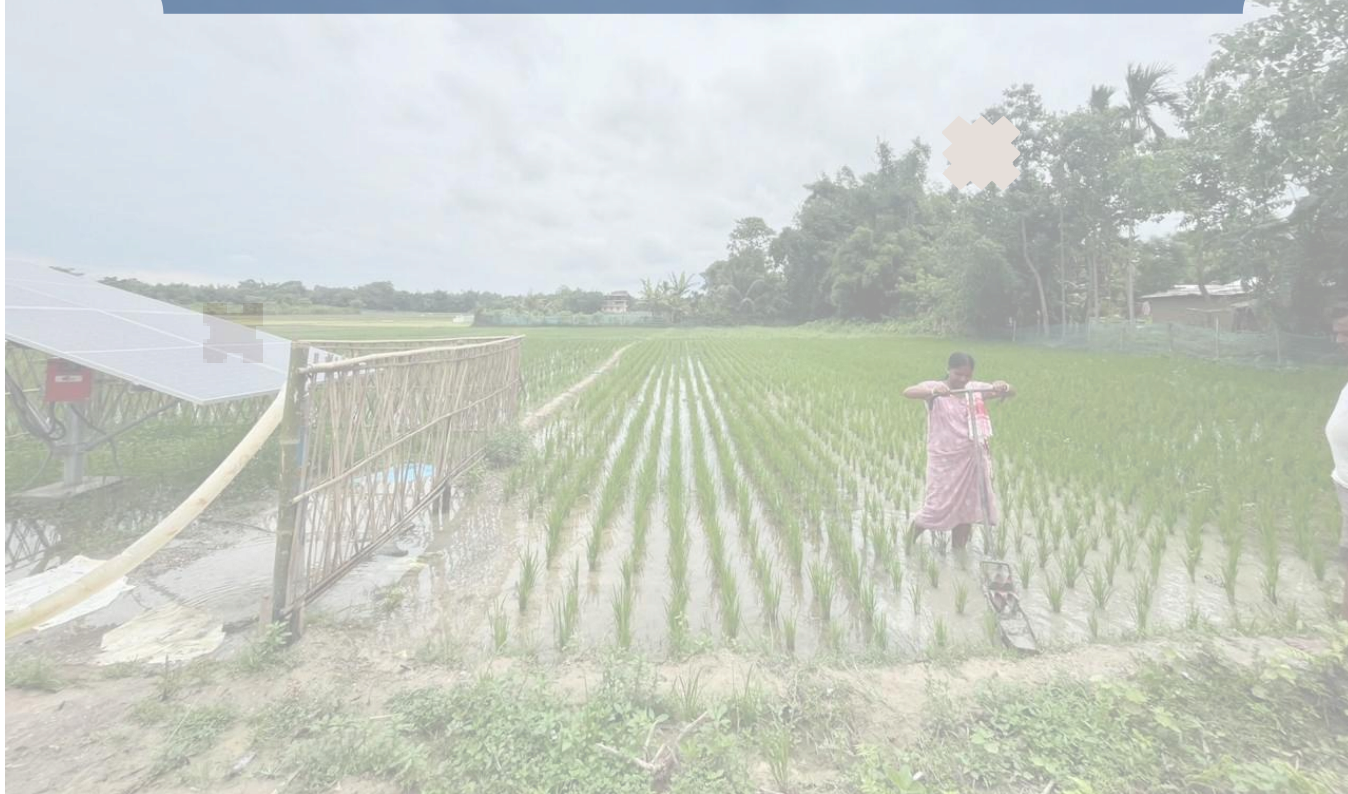
By integrating arsenic treatment within existing public infrastructure, strengthening community awareness through evidence-based engagement, and creating locally anchored systems for monitoring and governance, the intervention addressed these interconnected dimensions simultaneously. The AIRP improved water quality, but it was the women-led FTK group, the Water Users Committee, and the community's willingness to assume responsibility for the system that transformed infrastructure into a trusted public service.

The most important lesson from Balitara is that communities are not merely beneficiaries of water systems; they are essential partners in safeguarding them. Technical solutions create the foundation for safe water access, but long-term sustainability emerges when communities have the knowledge,

confidence, institutional platforms, and ownership necessary to manage and protect those systems themselves.

In this sense, the intervention offers a replicable model for strengthening rural drinking water safety through the convergence of public infrastructure, community leadership, local accountability, and evidence-based decision-making. It demonstrates that when technical innovation is matched by social ownership and institutional integration, communities can become not just consumers of safe water, but guardians of it.

From Water Scarcity to Water Governance: Convergence-Led Rural Transformation in Baltipar,



Executive Summary

Baltipar village in Assam's Tamulpur district historically suffered from chronic water scarcity, rain-fed agriculture, low productivity, and seasonal migration affecting nearly **53% of households**. Despite having 67 hectares of cultivable land, a lack of irrigation restricted farming to a single crop cycle.

To address this core challenge, **Gramya Vikash Mancha (GVM)** launched the **DWIMU initiative**, adopting a convergence-based approach. Supported by the **Bharat Rural Livelihoods Foundation (BRLF)**, **Azim Premji Foundation (APF)**, the **Bodoland Territorial Council (BTC) Government**, and local administration, the project introduced a. **Solar Irrigation:** PM-KUSUM scheme-supported solar systems to provide assured water, b. **Community Leadership:** Formation of a Water User Association (WUA) for participatory management, c. **Cross-Sector Convergence:** Integration with agriculture, handloom, animal husbandry, soil conservation, and rural development programs.

By framing water security as a catalyst rather than a standalone infrastructural issue, the initiative successfully expanded cultivation, diversified livelihoods, strengthened local institutions, and reduced distress migration. The Baltipar experience proves that community-led, multi-stakeholder approaches can turn shared developmental bottlenecks into sustainable rural transformation.

Context and Development Challenge

Baltipar village in Tamulpur district, Assam, was characterised by chronic water scarcity, low agricultural productivity, livelihood insecurity, and high levels of seasonal migration. Despite possessing approximately 67 hectares of cultivable land, agriculture remained entirely dependent on rainfall, making farming highly vulnerable to erratic weather conditions and seasonal variability. Field assessments conducted through participatory planning exercises revealed that not a single hectare of land in the village was under assured irrigation.

Paddy cultivation during the Kharif season was the dominant agricultural activity. However, crop success remained uncertain due to the absence of irrigation infrastructure and dependable water access. The lack of irrigation restricted year-round cultivation, limited opportunities for crop diversification, and constrained agricultural productivity.

These challenges had wider socio-economic implications. Approximately 53% of households reportedly migrated in search of livelihood opportunities, reflecting the limited availability of stable local employment and income-generating opportunities. For many households, migration functioned as a coping strategy in response to agricultural uncertainty and economic vulnerability.

The village possessed natural resources that could potentially support agricultural development. The Balti River and several small channels flowed near the settlement, while village ponds remained largely underutilised. However, the absence of systems for water storage, irrigation distribution, and collective water management prevented these resources from being effectively harnessed.

The developmental challenge therefore extended beyond water availability alone. It involved interconnected issues of:

- dependence on monsoon agriculture,
- low agricultural productivity,
- livelihood insecurity,
- weak livelihood diversification,
- ecological vulnerability,
- and migration-driven socio-economic instability.

The intervention emerged from the recognition that addressing water insecurity could unlock broader opportunities for livelihood enhancement, agricultural development, and community resilience.

Key Problem Indicators at Baseline

- Approximately 67 hectares of cultivable land with no assured irrigation.
- Agriculture entirely dependent on monsoon rainfall.
- Paddy cultivation largely limited to a single crop cycle.
- Approximately 53% of households reportedly migrating in search of livelihoods.

- Repeated crop failures associated with water scarcity.
- Underutilised ponds and natural water resources.
- Absence of irrigation infrastructure and water governance systems.
- Limited livelihood diversification and economic opportunities.



Figure 3 Before the intervention, 67 Hectares of land depended entirely on Rainfed irrigation

Intervention Design and Approach

The intervention was facilitated by GVM through the DWIMU initiative, supported by BRLF, APF, and the District Administration, Tamil Nadu.

Rather than treating irrigation as a standalone infrastructure challenge, the intervention adopted a convergence-based rural development approach that positioned water security as the foundation for broader livelihood transformation. The underlying premise was that addressing the village's irrigation constraints could create opportunities for agricultural diversification, livelihood enhancement, institutional strengthening, and reduced dependence on migration.

The intervention was built around four complementary pillars:

Participatory Planning and Community-Led Diagnosis

The intervention began with a Participatory Rural Appraisal (PRA) exercise conducted in November 2023. Through participatory methods and digital tools such as Open Data Kit, the DWIMU team worked with villagers to assess local resources, analyse cropping patterns, identify migration trends, and map village-level vulnerabilities.

Importantly, the process did not merely generate data. It enabled villagers to collectively identify irrigation and water insecurity as the primary constraints affecting agriculture and livelihoods, creating a shared understanding of the village's developmental priorities.

Water Security Through Renewable Energy

Based on findings from the PRA process, the intervention focused on improving irrigation access

through solar-powered irrigation systems under the PM-KUSUM scheme.

The approach linked water security, renewable energy and collective resource management. By combining irrigation infrastructure with renewable energy, the intervention sought to establish a sustainable foundation for agricultural development while reducing dependence on conventional energy sources.

Institutional Convergence

A defining feature of the intervention was its emphasis on convergence across multiple schemes, departments, institutions, and funding sources.

The strategy deliberately sought to align public programmes, administrative systems, philanthropic support, and community institutions around a shared developmental objective rather than implementing isolated sectoral interventions.

Livelihood Diversification

Recognising that irrigation alone would not guarantee improved livelihoods, the intervention integrated support for a) Crop diversification, b) Natural farming, c) Horticulture, d) Livestock development, e) Women-led handloom activities, and f) natural resource management.

The objective was to ensure that improved water access translated into broader livelihood opportunities and greater economic resilience.

Implementation Mechanism

The intervention was implemented through coordinated engagement between GVM, the Tamulpur District Administration, multiple government departments, philanthropic institutions, community groups, and village residents.

Phase 1: Participatory Diagnosis and Community Mobilisation

The process began with a PRA exercise that enabled villagers to collectively analyse local resources, agricultural systems, and livelihood challenges.

The assessment revealed a stark reality: despite possessing 67 hectares of cultivable land, the village had no irrigated area and remained entirely dependent on rainfall. The findings helped establish water security as the central developmental priority and strengthened community ownership of the planning process.

Importantly, the participatory process also shifted local perceptions. Farmers increasingly began to view water not merely as a resource constraint but as the foundation for wider agricultural and livelihood transformation.

Phase 2: Institutional Convergence and Resource Mobilisation

Following identification of irrigation as the primary developmental bottleneck, the intervention focused on mobilising support through convergence across multiple institutions and programmes.

Field visits by district authorities highlighted the relationship between repeated crop failures, livelihood insecurity, and migration. Based on these findings, solar irrigation systems were

recommended under the PM-KUSUM scheme.

Recognising that many households could not afford the required beneficiary contribution, GVM and the district administration facilitated support from the SELCO Foundation to bridge financing gaps. Additional resources were mobilised through Mission Vikalp to support boring and associated infrastructure requirements.

This convergence enabled access to resources that would have been difficult for individual households to secure independently.

Phase 3: Establishing Irrigation Infrastructure and Water Governance

Solar-powered irrigation systems were subsequently installed under PM-KUSUM Component B, making Baltipar one of the earliest villages in Assam to benefit from the scheme.

To support collective management and equitable access, a WUA was formed. Transit mapping exercises were conducted to identify ten boring points, while local governance mechanisms were established to guide water management and resource allocation.

By the time of assessment, ten solar irrigation pumps had been installed, with each pump serving multiple farmers through shared-use arrangements.

The creation of irrigation infrastructure was therefore accompanied by the establishment of local institutions capable of governing and sustaining the system.

Phase 4: Livelihood Activation Through Convergence

Once irrigation access was established, multiple departments and programmes contributed to livelihood development.

The Agriculture Department provided technical training, crop diversification support, and agricultural inputs. The Handloom and Textile Department supported the establishment of a women-led mini handloom cluster. Animal Husbandry and Veterinary services strengthened livestock management through training and vaccination programmes. Soil Conservation interventions promoted water harvesting, plantation activities, and riverbank protection measures.

This convergence transformed irrigation from a standalone infrastructure intervention into a platform for broader livelihood development.

Outcomes and Observable Changes

Improved Irrigation Access and Water Security

The most immediate outcome of the intervention was the establishment of assured irrigation in a village that previously depended entirely on rainfall. Through the installation of solar-powered irrigation systems and the development of community-level water governance mechanisms, farmers gained access to a more reliable source of water for cultivation.

This addressed the village's most significant developmental bottleneck and created the enabling conditions for subsequent changes in agriculture, livelihoods, and community resilience.

Increased Cropping Intensity and Agricultural Productivity

Improved irrigation access enabled farmers to move beyond single-season cultivation and make more intensive use of agricultural land. Farmers reported the ability to cultivate multiple crop cycles within a year, representing a significant departure from the earlier dependence on monsoon agriculture.

Field observations indicated that land previously left fallow after the Kharif season was increasingly being brought under cultivation. The intervention therefore contributed not only to greater water availability but also to more productive use of existing agricultural resources.

During field interactions, one farmer reported that prior to the intervention, water scarcity made it difficult to successfully complete even a single crop cycle. Within a year of gaining access to irrigation, he was able to cultivate three crop cycles, illustrating the transformative role of assured water access in agricultural production.

Another farmer, Mr. Hari Khanal, reported cultivating approximately 20 bighas of land and producing paddy, potato, mustard, and brinjal within a single year following the introduction of solar-powered irrigation. His experience reflects a broader trend towards crop diversification and more intensive farming systems.

Crop Diversification and Adoption of Improved Agricultural Practices

The intervention enabled farmers to diversify beyond traditional cultivation patterns. Alongside paddy cultivation, farmers began experimenting with a wider range of crops while adopting natural farming practices promoted through departmental support.

The use of inputs such as Jeevamrit¹, Panchagavya², Neemastra³, and other bio-based formulations reflects an emerging shift towards more sustainable cultivation practices. Improved irrigation access created the conditions necessary for farmers to adopt these practices with greater confidence and continuity.

Livelihood Diversification

The intervention expanded livelihood opportunities beyond agriculture alone.

Convergence with multiple departments enabled households to engage in a broader portfolio of livelihood activities, including horticulture, livestock development, handloom weaving, kitchen gardening, and backyard poultry. This reduced dependence on a single livelihood source and contributed to a more diversified local economy.

Importantly, livelihood diversification was not introduced as a standalone activity. Rather, it emerged as a secondary outcome of improved water security and coordinated institutional support.

Strengthened Women's Economic Participation

Women participated in the intervention through Self-Help Groups (SHGs), kitchen gardens,

¹ Fermented microbial bio-stimulant for improving soil health.

² Cow-based organic growth promoter for crops

³ Neem-based biopesticide used for natural pest control.

horticulture activities, and handloom-based enterprises.

A notable outcome was the establishment of a mini handloom cluster supported through convergence with the Handloom and Textile Department. The cluster currently supports 31 women and has received three Jacquard looms, creating opportunities for skill development and income generation.

The intervention therefore contributed to expanding women's participation in local livelihood activities while strengthening their engagement with community development processes.

Improved Livestock Management

Convergence with the Animal Husbandry and Veterinary Department introduced scientific livestock management practices, training programmes, and regular vaccination support.

Community members reported improved livestock health and reduced disease-related losses among goats and pigs. Backyard poultry activities also emerged as an additional livelihood opportunity for several households.

While detailed economic data is not yet available, these changes suggest improved resilience and reduced livelihood risks associated with livestock rearing.

Strengthened Community Institutions and Local Governance

The formation of the WUA represents one of the intervention's most significant institutional outcomes.

The WUA established a platform for collective decision-making, water resource management, and shared responsibility for irrigation infrastructure. By creating a local governance mechanism around water access, the intervention moved beyond infrastructure provision and strengthened the community's capacity to manage shared resources.



Figure 4 (A): Baltipar, after the intervention of PM-KUSUM



Figure 5 (A): Baltipar, after the intervention of PM-KUSUM

Assessment Across Analytical Dimensions

Institutional Dimensions	The Baltipar intervention demonstrates a high degree of institutional convergence centred around a shared developmental objective. Rather than implementing isolated sectoral activities, the intervention aligned multiple schemes, departments, administrative systems, philanthropic institutions, and community organisations around the challenge of water insecurity. This convergence enabled resources, technical expertise, and financial support to be mobilised in ways that would have been difficult through any single programme acting independently. The intervention also illustrates the importance of local institutions in sustaining development outcomes. The Water User Association emerged as a critical governance mechanism that connected infrastructure management with community participation and collective accountability. A particularly noteworthy aspect of the model was its ability to bridge affordability barriers. Support from the SELCO Foundation enabled economically vulnerable households to access PM-KUSUM benefits that may otherwise have remained inaccessible. This demonstrates how strategic philanthropic engagement can complement public programmes and improve inclusion. The intervention therefore highlights that successful rural development often depends less on individual schemes and more on the ability to coordinate institutions around locally identified priorities.
	The intervention combined participatory planning tools, renewable energy-based irrigation systems, natural resource management measures, and sustainable agricultural practices.



Technical Dimensions	The use of digital tools such as Open Data Kit alongside PRA strengthened evidence-based planning and helped ensure that interventions responded to locally identified needs. The introduction of solar-powered irrigation addressed a critical infrastructure gap while reducing dependence on conventional energy sources. By linking irrigation access with renewable energy, the intervention demonstrated an environmentally sustainable approach to agricultural development. Technical support from line departments further enabled farmers to adopt improved agricultural practices, diversify crops, and strengthen livestock management systems. However, the long-term effectiveness of these technical investments will depend on continued maintenance of irrigation infrastructure, groundwater sustainability, and access to technical support services.
Social Dimensions	The intervention placed strong emphasis on community participation and collective decision-making. The participatory planning process ensured that development priorities emerged from community consultations rather than external prescriptions. This contributed to stronger local ownership and increased acceptance of subsequent interventions. Women's participation was visible through SHGs, kitchen gardens, horticulture activities, and handloom enterprises. The establishment of the women-led handloom cluster illustrates how convergence can create livelihood opportunities beyond agriculture while supporting economic participation among women. The intervention also sought to address one of the village's most pressing social challenges: livelihood insecurity linked to seasonal migration. Although evidence on migration outcomes is not yet available, improved agricultural opportunities and livelihood diversification have the potential to reduce the economic pressures that previously drove households to seek work elsewhere. At the same time, further evidence would be required to assess how benefits have been distributed across different social groups and whether all households have been able to access opportunities generated through the intervention.
	Ecological sustainability is embedded within the design of the intervention. The model integrates renewable energy, water resource management, natural farming practices, plantation activities, and soil conservation measures within a single development framework. Rather than treating productivity and sustainability as competing objectives, the intervention seeks to achieve both simultaneously.

Ecological Sustainability	Solar-powered irrigation reduces dependence on fossil-fuel-based energy systems, while natural farming practices encourage reduced reliance on synthetic agricultural inputs. Water harvesting measures and riverbank protection activities further contribute to ecological resilience. The intervention therefore demonstrates how water security initiatives can be designed to support both livelihood enhancement and environmental sustainability.
Innovation	The intervention's primary innovation lies not in the solar pumps themselves, but in the way water security was used as a platform for convergence-led rural transformation. Many rural development programmes address irrigation, agriculture, livestock, women's livelihoods, or natural resource management as separate sectors. The Baltipar model instead treated water insecurity as a shared developmental bottleneck around which multiple institutions, schemes, and stakeholders could align their efforts. This approach transformed irrigation from a standalone infrastructure intervention into a catalyst for broader change. Improved water access created opportunities for crop diversification, natural farming, women's economic participation, livestock development, and community institution-building. The intervention also demonstrates innovation in financing and implementation. By combining government schemes, district administration support, philanthropic contributions, and community institutions, it overcame barriers that would likely have prevented vulnerable households from accessing benefits independently. The most significant innovation therefore lies in demonstrating how convergence can be operationalised around a locally identified priority to generate outcomes that extend well beyond the original intervention sector.

The five dimensions reinforce one another in mutually reinforcing ways. Participatory planning enabled institutions to converge around a clearly defined developmental challenge. Institutional convergence mobilised technical resources, infrastructure, and financial support. Improved technical systems created opportunities for agricultural expansion and livelihood diversification. These livelihood opportunities strengthened community participation and local ownership, which in turn reinforced the functioning of institutions such as the Water User Association.

Ecological sustainability further strengthens this system by ensuring that livelihood gains are supported through renewable energy, natural resource management, and sustainable agricultural practices.

Together, these interactions demonstrate that the intervention's outcomes cannot be attributed to

any single component. Rather, they emerged from the alignment of institutions, technology, community participation, and environmental stewardship around a shared objective of water security and rural development.

Scalability and Replicability Potential

The Baltipar model demonstrates strong potential for replication in rural regions facing water scarcity, rain-fed agriculture, low agricultural productivity, and migration-linked livelihood distress. Its strength lies not in a single intervention or technology, but in the integration of participatory planning, institutional convergence, community ownership, renewable energy, and livelihood diversification around a shared developmental objective.

A key advantage of the model is that it largely leverages existing government schemes and institutional mechanisms rather than creating parallel delivery systems. PM-KUSUM, MGNREGA, Mission Vikalp⁴, departmental programmes, and community institutions collectively formed the foundation of the intervention, making replication potentially feasible within existing policy and administrative frameworks.

Several features strengthen its scalability such as Participatory and Evidence-Based Planning, Water Security as an Entry Point, Convergence-Based Implementation, Community Institutions, Renewable Energy Integration

The model appears particularly relevant for climate-vulnerable rural regions where water insecurity acts as a constraint on agricultural productivity and livelihood development.

Key Insights, Constraints and Limitations

What worked	Constraints
Water Security Catalysed Broader Rural Transformation The most significant lesson emerging from Baltipar is that water security can function as a foundation for wider development outcomes. Once irrigation constraints were addressed, opportunities emerged for agricultural diversification, livelihood enhancement, women's economic participation, livestock development, and community institution-building. Participatory Planning Strengthens Ownership The intervention demonstrates the value of	Despite its achievements, the intervention continues to face several constraints that may affect long-term outcomes. Dependence on Groundwater Resources While solar irrigation has improved access to water, the long-term sustainability of the system depends on adequate groundwater availability and recharge. Continued extraction without monitoring or replenishment measures could create future resource pressures. Operation and Maintenance Challenges The effectiveness of the irrigation system depends on regular maintenance of solar pumps and

⁴ sanctioned by the Honourable Governor of Assam, covered the boring costs of the pumps

participatory planning as more than a diagnostic exercise. By involving villagers in identifying problems and priorities, the process strengthened local ownership and created a shared understanding of development challenges and solutions.

Convergence Unlocked Resources Beyond Individual Schemes

The intervention illustrates how convergence across government programmes, district administration, civil society organisations, and philanthropic institutions can overcome barriers that individual schemes may be unable to address independently.

Infrastructure Generated Greater Impact When Supported by Institutions

The establishment of the WUA highlights the importance of governance structures in sustaining infrastructure investments. Irrigation systems become more effective when accompanied by mechanisms for collective management, accountability, and equitable access.

Livelihood Diversification Requires Ecosystem Support

The intervention shows that livelihood diversification is most effective when multiple sectors are supported simultaneously. Agriculture, livestock, handloom, horticulture, and natural resource management reinforced one another rather than operating as isolated interventions.

associated infrastructure. Limited access to technical support or repair services could affect long-term functionality.

Market Access and Enterprise Development

Increased production does not automatically translate into improved incomes. Farmers may continue to face challenges related to market access, aggregation, storage, value addition, and enterprise development.

Equity in Water Distribution

The long-term success of the model depends on ensuring equitable access to irrigation resources. This places significant responsibility on the Water User Association and local governance systems to manage competing demands fairly and transparently.

Sustaining Convergence

The intervention benefited from strong administrative leadership and active engagement from multiple departments. Maintaining this level of coordination over time may present challenges once project-driven facilitation reduces.

Conclusion

The Baltipar experience demonstrates how a village facing chronic water scarcity, agricultural stagnation, and livelihood insecurity can begin to transform when development efforts are

organised around a shared and locally identified priority.

At the outset, the village possessed cultivable land, natural water resources, and strong community aspirations, yet lacked the infrastructure, institutions, and coordination necessary to convert these assets into sustainable livelihoods. Water insecurity acted as the central constraint linking low agricultural productivity, limited livelihood opportunities, and high levels of migration.

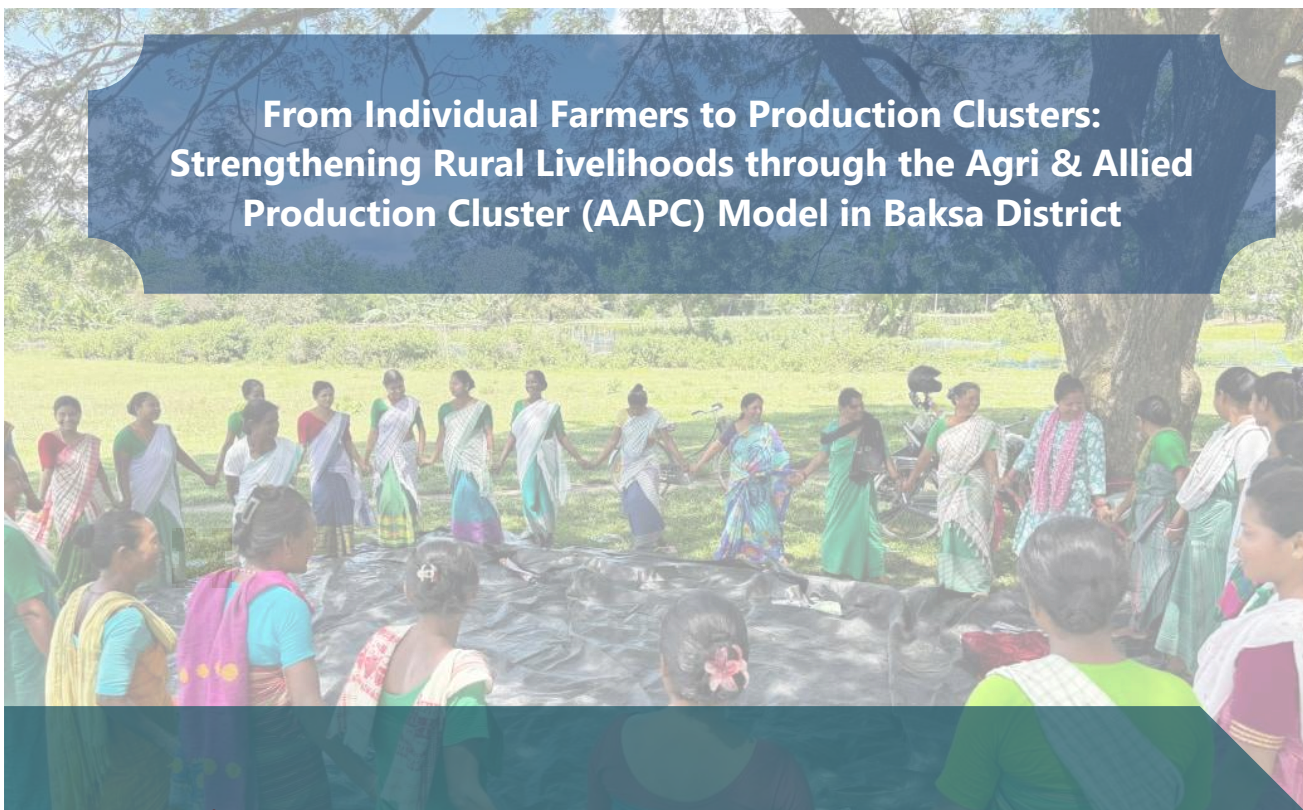
Rather than addressing these challenges through isolated interventions, the DWIMU initiative facilitated a convergence-based approach that aligned community priorities, government programmes, administrative leadership, philanthropic support, and local institutions around a common objective. Improved irrigation access created opportunities for agricultural intensification, crop diversification, women's livelihood activities, livestock development, and stronger community institutions.

The most important lesson from Baltipar is that water security is not merely an agricultural issue. When approached through participatory planning and collective action, it can become a catalyst for broader social, economic, and institutional transformation.

The intervention therefore offers more than a model of solar-powered irrigation. It demonstrates how locally identified challenges can serve as platforms for convergence, enabling communities, institutions, and development actors to work towards shared and sustainable rural development outcomes. In this sense, Baltipar's journey illustrates the power of water governance—not simply water infrastructure—as a foundation for resilient and inclusive rural transformation.



From Individual Farmers to Production Clusters: Strengthening Rural Livelihoods through the Agri & Allied Production Cluster (AAPC) Model in Baksa District



Executive Summary

Small and marginal farmers across Baksa district have historically faced multiple constraints that limited their ability to translate agricultural production into sustainable livelihoods. Fragmented landholdings, individualised production systems, weak bargaining power, limited access to quality inputs, and dependence on local traders often resulted in low returns despite substantial labour investments. Farmers typically procured inputs and marketed their produce individually, limiting their ability to benefit from economies of scale, aggregation, or collective negotiation.

Since 2019, Seven Sisters Development Assistance (SeSTA) has worked across 58 villages and 12 Village Council Development Committees (VDCs) in two blocks of Baksa district to address these challenges through the Agri & Allied Production Cluster (AAPC) Model. The approach combines participatory planning, cluster-based farmer organisation, local entrepreneurship, convergence with government programmes, and collective market engagement to transform dispersed producers into coordinated production systems.

The model currently supports 12 livelihood clusters across five sectors—Backyard Poultry, Goatery, Piggery, Plantation, and Vegetable Cultivation, bringing 3942 households into structured livelihood systems and leveraging more than ₹21.11 crore through convergence with MGNREGA, ASRLM, MMUA, and other government programmes. Eleven women entrepreneurs have emerged as local service providers and market facilitators, while cluster-based planning has strengthened production coordination, input supply systems, market access, and community institutions.

Context and Development Challenge

Agriculture and allied livelihoods form the backbone of rural economies across Baksa district. However, despite substantial engagement in farming, livestock rearing, and allied activities, many small and marginal producers continued to face persistent barriers that limited productivity, profitability, and long-term livelihood security.

Farmers were operating within fragmented production systems that limited their ability to benefit from scale, coordination, and market participation. Small landholdings constrained production volumes, while individual procurement of inputs increased costs and reduced bargaining power. Farmers typically sold produce independently and often accepted prices determined by traders because they lacked aggregation mechanisms, storage facilities, collective negotiation platforms, and direct market access.

These constraints extended beyond marketing alone. Limited access to technical support, weak integration with government programmes, inadequate livelihood planning, and the absence of locally embedded service providers further restricted opportunities for growth. While individual farmers possessed valuable productive assets and skills, they lacked the institutional structures required to participate effectively in increasingly competitive agricultural markets.

Participatory planning exercises conducted by SeSTA revealed additional challenges related to livelihood planning, natural resource management, community institution strengthening, access to government schemes, and coordination between communities and public institutions. The planning process highlighted the need for approaches that could simultaneously strengthen production systems, community institutions, convergence mechanisms, and market linkages.

The central development challenge therefore extended beyond agricultural production. It involved creating systems through which small and marginal farmers could function collectively, access services at scale, strengthen market participation, and improve livelihood outcomes without losing local ownership and control.

Key Challenges at Baseline

- Fragmented and individualised production systems.
- Weak bargaining power in input and output markets.
- Dependence on local traders and intermediaries.
- Limited aggregation and collective marketing mechanisms.
- Inadequate access to quality inputs and technical services.
- Weak convergence with government livelihood programmes.
- Limited opportunities for value addition and enterprise development.
- Absence of organised production systems linking farmers, entrepreneurs, finance, and

markets.

- Livelihood vulnerabilities among small and marginal farming households.

Intervention Design and Approach

SeSTA introduced the Agri & Allied Production Cluster (AAPC) Model as a response to the structural constraints facing smallholder farmers in Baksa district. The model is based on a simple but transformative principle: farmers cultivating similar crops or engaging in similar livelihood activities can achieve better economic outcomes when they function collectively rather than as isolated producers.

Rather than focusing solely on production enhancement, the intervention sought to build complete livelihood systems that integrated planning, production, entrepreneurship, finance, aggregation, and market access.

The intervention was built around five interrelated pillars:

Participatory Planning and Community-Led Identification

The intervention began with extensive participatory planning processes involving Gram Panchayats, Village Organisations (VOs), Self-Help Groups (SHGs), community members, and local institutions. Through orientation sessions, e-PRA exercises, resource mapping, Natural Resource Management (NRM) planning, transect walks, ODK-based household surveys, Gram Sabha participation, and district-level consultations, communities collectively identified livelihood opportunities, institutional gaps, and development priorities.

This process ensured that cluster formation emerged from local realities rather than externally imposed programme designs.

Cluster-Based Livelihood Organisation

Farmers were organised into commodity-based production clusters comprising approximately 250–300 farmers operating within similar agro-ecological conditions. Cluster commodities were identified through community consultations facilitated by SeSTA professionals, allowing farmers to collectively determine the activities most suited to local conditions and market opportunities.

The cluster approach aimed to overcome the limitations of fragmented production by creating economies of scale in procurement, production planning, training, aggregation, and marketing.

Local Entrepreneurship Development

A distinctive feature of the model is the integration of local agri and allied entrepreneurs within each cluster. Rather than relying on external service providers, SeSTA promoted local entrepreneurs who could supply inputs, support aggregation, facilitate market access, and provide technical guidance within their own communities. Eleven women entrepreneurs have already emerged through the model across poultry, nursery development, pig breeding, and goatery enterprises.

Convergence and Resource Mobilisation

The intervention deliberately leveraged convergence with government programmes and institutional partners. Through linkages with ASRLM, MGNREGA, MMUA, line departments, and local administration, the model sought to mobilise financial resources, infrastructure support, technical expertise, and livelihood assets that individual farmers would have struggled to access independently.

Market System Development

The AAPC model recognises that improved production alone does not guarantee improved livelihoods. Accordingly, the intervention simultaneously addresses backward and forward market linkages through collective procurement, aggregation, production planning, quality improvement, and market facilitation. By strengthening both input and output markets, the model seeks to improve farmers' participation in value chains while reducing transaction costs and market vulnerabilities.

Implementation Mechanism

The Agri & Allied Production Cluster (AAPC) Model was implemented through a structured process that combined participatory planning, institutional convergence, cluster formation, entrepreneurship development, and market system strengthening. Rather than beginning with livelihood asset distribution, the intervention first focused on understanding local realities, building community ownership, and establishing institutional mechanisms capable of supporting long-term livelihood development.

Phase 1: Participatory Planning and Community Mobilisation

The intervention began with extensive participatory planning processes at Gram Panchayat, village, block, and district levels. Community orientation sessions introduced villagers to livelihood opportunities, MGNREGA provisions, community institutions, and collective planning processes. Through Participatory Rural Appraisal (PRA), resource mapping, land-use assessments, social mapping, natural resource management planning, and transect walks, communities analysed local resources, existing livelihood systems, and development constraints.

ODK-based surveys were used to collect household-level information, while Gram Sabha discussions enabled community members to prioritise development needs and livelihood opportunities. The process generated locally grounded evidence that informed subsequent planning and cluster formation.

Importantly, participatory planning served not only as a diagnostic exercise but also as a mechanism for building ownership. Communities became active participants in identifying opportunities, selecting livelihood activities, and shaping implementation priorities.

Phase 2: Institutional Convergence and Collective Action Planning

Information generated through the participatory planning process was subsequently shared with

government departments, local institutions, and administrative stakeholders through block-level discussions, district workshops, and review meetings. These platforms enabled stakeholders to collectively identify implementation gaps, align resources, and develop coordinated action plans.

The intervention deliberately sought to position community priorities within existing government programmes rather than creating parallel delivery mechanisms. Convergence with MGNREGA, Assam State Rural Livelihood Mission (ASRLM), Assam Mukhyamantri Mahila Udyamita Abhiyan (MMUA), and line departments became a critical implementation strategy for mobilising financial resources, livelihood assets, and technical support.

Capacity-building programmes were also conducted for block-level officials, Village Organisation sub-committees, and community institutions to strengthen their ability to engage with planning, implementation, and monitoring processes.

Phase 3: Formation of Agri & Allied Production Clusters

Based on participatory assessments and local resource availability, farmers were organised into commodity-based livelihood clusters. Each cluster typically brought together approximately 250–300 farmers engaged in similar livelihood activities within a common agro-ecological landscape. Cluster commodities were selected through facilitated discussions among community members, allowing farmers themselves to determine the activities most appropriate for local conditions and market opportunities.

The intervention currently supports twelve livelihood clusters across five sectors:

- Backyard Poultry
- Goatery
- Piggery
- Plantation
- Vegetable Cultivation

Together, these clusters engage 1,897 households across 58 villages in Baksa district.

The cluster architecture was designed to create economies of scale that individual farmers could not achieve independently. By operating collectively, farmers gained access to coordinated training, input procurement, aggregation systems, financial linkages, and market opportunities.

Phase 4: Promotion of Rural Entrepreneurs

A defining feature of the AAPC model is the integration of local entrepreneurs within each production cluster.

SeSTA identified and supported local agri and allied entrepreneurs who could serve as service providers, aggregators, input suppliers, and market facilitators. These entrepreneurs were trained in technical aspects of production as well as business management, enterprise development, and

financial literacy.

By the time of assessment, eleven women entrepreneurs had been promoted across different livelihood sectors, including backyard poultry, nursery development, pig breeding, and goatery enterprises. Their presence enabled clusters to access services locally while simultaneously creating new enterprise opportunities within rural communities.

Phase 5: Strengthening Production Systems and Market Linkages

Once clusters were established, the intervention focused on strengthening production and market systems.

Cluster members participated in thematic training programmes, exposure visits, livelihood planning exercises, and technical capacity-building initiatives. Family-Based Livelihood Planning (FBLP) and micro-credit planning processes helped households identify opportunities for livelihood expansion and investment.

The model simultaneously addressed both backward and forward market linkages.

On the backward side, cluster-level procurement systems reduced input costs and improved access to quality inputs. Local entrepreneurs facilitated the distribution of seeds, livestock inputs, bio-fertilisers, and other production requirements. Bulk procurement created economies of scale that individual farmers would have struggled to achieve independently.

On the forward side, clusters facilitated aggregation, grading, sorting, and collective marketing of produce. The objective was to improve farmers' market access, strengthen negotiating power, and reduce dependence on local intermediaries. Over time, the model also seeks to support branding, value addition, institutional market linkages, and expanded market participation.

Phase 6: Monitoring, Learning and Adaptive Management

The intervention incorporates multiple mechanisms for ongoing monitoring and learning.

The intervention incorporates regular review mechanisms, digital communication platforms, and MIS-based tracking systems to support monitoring, learning, accountability, and adaptive management across clusters.

Outcomes and Observable Changes

Formation of Structured Livelihood Systems

The most significant outcome of the intervention has been the transition from dispersed individual livelihood activities towards structured and coordinated production systems.

12 AAPCs have been established across Baksa district, bringing together 1,897 households across five livelihood sectors. These clusters provide farmers with a platform for collective planning, production, learning, aggregation, and market engagement.

This shift represents a fundamental change in how smallholder farmers engage with livelihood activities.



Figure 6 SHG members in selected clusters being trained in production of organic manures

Strengthened Access to Convergence Resources

The intervention has successfully leveraged more than ₹2.62 crore through convergence with MGNREGA, ASRLM, MMUA, and other government programmes. These resources have supported livelihood infrastructure, productive assets, and enterprise development across multiple sectors.

The convergence model demonstrates how coordinated institutional engagement can significantly expand opportunities available to rural households beyond what individual schemes may achieve in isolation.

Emergence of Rural Women Entrepreneurs

One of the most visible outcomes of the intervention has been the emergence of women entrepreneurs within the cluster ecosystem.

Eleven women entrepreneurs have been promoted across poultry, nursery development, pig breeding, and goatery enterprises. These entrepreneurs perform functions that traditionally remained unavailable within rural communities, including input supply, aggregation, technical support, and market facilitation.

Their emergence contributes not only to livelihood generation but also to strengthening local service ecosystems and women's economic participation.



Figure 7 Pratibha Baishya, SHG member from Maithabari cultivating multiple crops after Jeevamrit Training

Strengthened Livelihood

The available evidence suggests positive improvements in livelihood performance across several sectors.

Backyard Poultry clusters currently engage 508 farmers across four clusters and report a mortality rate of approximately 2.8 percent. Goatery clusters support 607 farmers with mortality rates below

1 percent, while Piggery clusters involving 342 farmers reported no mortality after February 2026.

These outcomes indicate improvements in technical management, access to services, and producer capacities within cluster systems.



Figure 8 BYP chicks being cared for in one of the clusters promoted by SeSTA

Expanded Access to Livelihood Opportunities

The intervention has expanded livelihood opportunities across a diverse portfolio of activities including poultry, goatery, piggery, plantation development, vegetable cultivation, nursery enterprises, and allied activities.

This diversification reduces dependence on a single livelihood source and creates multiple pathways through which households can strengthen income generation and resilience.



Improved Market Participation

Although the clusters remain in different stages of maturity, the intervention has already established mechanisms for collective procurement, aggregation, grading, sorting, and market linkage. Farmers who previously operated as isolated sellers are increasingly participating in organised market systems capable of improving access, reducing transaction costs, and strengthening negotiating power.

The intervention therefore represents an important shift from individual production towards collective market participation.

Assessment Across Analytical Dimensions

Institutional Dimensions	The AAPC model demonstrates a strong institutional architecture built upon the convergence of community institutions, government programmes, administrative systems, and local entrepreneurship.
---------------------------------	---

	Rather than functioning as a standalone project, the intervention deliberately aligns SHGs, Village Organisations, Gram Sabhas, government departments, ASRLM structures, MGNREGA systems, and market actors around shared livelihood objectives. This convergence enables access to resources, infrastructure, technical services, and financing that individual households would struggle to mobilise independently. A notable institutional contribution of the model is its ability to transform community institutions from beneficiary groups into active actors within local economic systems. Farmers participate not merely as recipients of support but as members of production clusters capable of collective planning, implementation, and market engagement.
Technical Dimensions	The intervention combines participatory planning methodologies, digital data collection, livelihood profiling, market planning, production coordination, and enterprise development within a single implementation framework. Tools such as e-PRA, GIS-based mapping, ODK surveys, MIS systems, and livelihood profiling strengthen evidence-based planning and monitoring. Technical training, exposure visits, and entrepreneur development further support improvements in production practices and livelihood management. Importantly, the intervention extends technical support beyond production alone to encompass aggregation, market systems, enterprise management, and value chain development.
Social Dimensions	The intervention places strong emphasis on participation, inclusion, and community ownership. Farmers are selected through community-based processes involving SHGs and vulnerability-based identification mechanisms. Cluster formation, commodity selection, and livelihood planning are undertaken through facilitated discussions rather than top-down allocation. This strengthens local ownership and ensures that interventions remain grounded in community priorities. Women's participation is particularly significant. Women constitute the majority of cluster members and play visible roles as entrepreneurs, producers, and community leaders within the cluster ecosystem. The promotion of women entrepreneurs further expands opportunities for



	leadership and economic participation.
Innovation	The primary innovation of the AAPC model lies in its shift from household-level livelihood promotion to ecosystem-based livelihood development. Rather than supporting farmers as individual producers, the model organises them into commodity-based production clusters linked to local entrepreneurs, government programmes, financial resources, technical services, and markets. In doing so, it addresses the structural constraints that often prevent smallholder farmers from benefiting from economies of scale and market participation. A second innovation is the integration of locally embedded entrepreneurs within each cluster. These entrepreneurs function as input suppliers, service providers, aggregators, and market facilitators, ensuring that critical economic functions remain rooted within communities while creating new opportunities for rural enterprise development. The model also introduces coordinated production planning through staggered production calendars that help reduce market gluts, improve supply consistency, and strengthen farmers' market engagement. Together, these innovations transform fragmented livelihood activities into organised production systems capable of generating more sustainable economic outcomes.
Ecological Sustainability	Several features of the intervention contribute to ecological sustainability. Natural farming practices, organic production methods, orchard development, natural resource management planning, and convergence with MGNREGA-supported asset creation all contribute to strengthening ecological resilience. Exposure visits and technical training on organic practices further encourage environmentally sustainable production systems. The integration of livelihood development with natural resource management helps ensure that economic gains are pursued alongside environmental stewardship rather than at its expense.

The various dimensions of the intervention reinforce one another in mutually supportive ways. Participatory planning strengthens institutional ownership and informs technical decision-making. Institutional convergence mobilises resources and enables cluster formation. Cluster-based organisation improves market participation and creates opportunities for entrepreneurship. Entrepreneurs strengthen service delivery and support production systems. Improved production

systems enhance livelihood opportunities, while ecological planning contributes to long-term sustainability.

Together, these interactions demonstrate that the intervention's outcomes arise not from any single component, but from the alignment of institutions, communities, markets, entrepreneurs, and livelihood systems around a shared vision of collective economic development.

Scalability and Replicability Potential

The Agri & Allied Production Cluster (AAPC) Model demonstrates strong potential for replication in rural regions characterised by smallholder agriculture, fragmented production systems, weak market access, and limited livelihood opportunities. Its strength lies not in any single commodity or livelihood activity, but in the institutional framework through which production, entrepreneurship, convergence, and market systems are integrated.

A key advantage of the model is that it builds upon existing community institutions and government programmes rather than creating parallel structures. Self-Help Groups (SHGs), Village Organisations (VOs), ASRLM platforms, MGNREGA resources, MMUA support, and line department services are leveraged within a common framework, making replication potentially feasible within existing policy and programme ecosystems.

Several characteristics enhance the model's scalability:

Participatory and Evidence-Based Planning

The intervention is rooted in participatory planning processes that enable communities to identify livelihood opportunities, resource constraints, and development priorities. The use of e-PRA, GIS-based mapping, ODK surveys, livelihood profiling, and village-level planning creates a strong foundation for context-specific implementation.

Flexible Commodity Selection

The model does not prescribe a fixed livelihood activity. Instead, clusters are developed around commodities and enterprises identified by communities based on local resources, market opportunities, and agro-ecological conditions. This flexibility enhances adaptability across diverse rural contexts.

Convergence-Based Resource Mobilisation

The successful mobilisation of more than ₹2.62 crore through convergence demonstrates how the model can leverage existing public resources rather than depending exclusively on external project funding. This significantly strengthens the prospects for long-term sustainability and expansion.

Embedded Rural Entrepreneurship

The integration of local entrepreneurs provides an important mechanism for sustaining service delivery beyond project cycles. Entrepreneurs support input supply, aggregation, technical

services, and market access while simultaneously generating local economic opportunities.

Market-Oriented Production Systems

Unlike many livelihood interventions that focus primarily on production, the AAPC model incorporates market engagement from the outset. The emphasis on aggregation, staggered production, collective procurement, and market linkage improves the likelihood that increased production translates into improved economic outcomes.

Conditions Required for Replication

The model's success is closely linked to several enabling conditions:

- Strong community institutions.
- Effective facilitation and mobilisation.
- Functioning convergence mechanisms.
- Access to technical support services.
- Entrepreneurial leadership within clusters.
- Market opportunities for cluster commodities.
- Continued community participation and ownership.

Replication efforts that focus solely on asset distribution or commodity promotion without these supporting systems may not achieve comparable results.

Key Insights, Constraints and Limitations:

Key Insights	Constraints
Community Institutions Can Function as Economic Institutions The AAPC model demonstrates that community institutions such as SHGs, Village Organisations, and production clusters can play roles that extend beyond social mobilisation and programme implementation. When supported through appropriate facilitation and market linkages, these institutions can become platforms for collective planning, resource mobilisation, entrepreneurship, aggregation, and market engagement. This significantly expands their contribution to local economic	Building Collective Behaviour Takes Time One of the most significant challenges has been developing a collective mindset among farmers accustomed to operating independently. The transition from individual production and marketing to coordinated cluster-based systems requires sustained mobilisation, trust-building, and perspective transformation. This remains an ongoing process and continues to require facilitation and support.

development.

Livelihood Promotion Requires Ecosystem Development

The experience highlights that sustainable livelihood enhancement depends on more than increasing production. Access to inputs, technical services, finance, entrepreneurship, aggregation systems, and markets are interconnected elements of a functioning livelihood ecosystem. Improvements in one area are often insufficient unless supported by complementary investments across the wider system.

Local Entrepreneurship Strengthens Rural Value Chains

Embedding entrepreneurs within production clusters helps address critical gaps in service delivery, input supply, aggregation, and market access. Because these entrepreneurs operate within the same communities they serve, they improve accessibility, strengthen local accountability, and create additional livelihood opportunities. The model demonstrates that rural entrepreneurship can be an important driver of both economic growth and institutional sustainability.

Convergence Multiplies the Impact of Public Investments

The successful mobilisation of resources through MGNREGA, ASRLM, MMUA, and other programmes illustrates the value of convergence-based approaches. Rather than relying on a single scheme or funding source, the intervention aligned multiple institutions around shared livelihood

Market Systems Are Still Evolving

Although aggregation and market linkage mechanisms have been established, several clusters remain in relatively early stages of market development. Strengthening value chains, securing stable buyers, expanding value addition, and developing stronger branding mechanisms will require continued effort.

Dependence on Effective Entrepreneurs

The success of cluster operations is influenced by the capacity and performance of local entrepreneurs. Supporting entrepreneur development, mentoring, and succession planning will remain important as clusters mature.

Maintaining Participation Across Large Clusters

Clusters involving 250–300 farmers require sustained coordination, communication, and engagement. Ensuring continued participation and collective decision-making across large groups can be challenging and demands ongoing institutional support.

objectives. This enabled communities to access a wider range of assets, services, and opportunities than would have been possible through isolated programme implementation.

Market Participation Begins Long Before Marketing

A notable lesson from the intervention is that market engagement is shaped not only by how produce is sold, but by how production systems are organised. Cluster formation, collective procurement, production planning, entrepreneurship, and aggregation all influence farmers' ability to participate effectively in markets. Strengthening market outcomes therefore requires interventions across the entire value chain rather than a narrow focus on sales and market linkage alone.

8. How convergence with other CSOs can help/support in bridging the gaps

The AAPC model demonstrates how cluster-based approaches can strengthen rural livelihoods by integrating production systems, entrepreneurship, market engagement, and institutional convergence. However, several opportunities remain to deepen and sustain these gains.

TRI can play an important role in documenting, disseminating, and promoting cluster-based livelihood models that move beyond conventional beneficiary-oriented approaches. Facilitating peer learning across organisations and geographies can help strengthen understanding of how production systems, entrepreneurship, and market linkages can be integrated within community-led development frameworks.

Government agencies can support the scaling of the model by strengthening convergence across ASRLM, MGNREGA, MMUA, agriculture, animal husbandry, horticulture, and rural development programmes. Continued support for productive infrastructure, enterprise promotion, value chain development, and market linkage initiatives will be critical for enabling clusters to mature into sustainable economic systems.

There is also considerable scope to strengthen market-facing components of the intervention.

Support for collection centres, storage facilities, processing infrastructure, branding, packaging, quality certification, digital marketing platforms, and institutional procurement mechanisms can help clusters capture greater value from their production activities.

Other CSOs can contribute by strengthening community institutions, supporting entrepreneur development, facilitating market research, promoting producer collectives, and documenting lessons emerging from cluster-based approaches. Particular attention may be given to strengthening women's entrepreneurship and expanding opportunities for youth participation within rural value chains.

Finally, there is a need for stronger evidence generation around long-term livelihood outcomes. Investments in monitoring, impact assessment, and action research can help inform future policy and replication efforts while strengthening the evidence base for cluster-driven livelihood development.

Conclusion

The Agri & Allied Production Cluster (AAPC) Model demonstrates that strengthening rural livelihoods requires more than improving production at the household level. Sustainable livelihood gains emerge when farmers are supported through systems that connect production, entrepreneurship, finance, institutions, and markets.

By organising smallholders into production clusters, promoting local entrepreneurs, and leveraging institutional convergence, the intervention created pathways through which farmers could access opportunities that would have remained difficult to achieve individually. The model strengthened not only production systems, but also the institutional and market relationships that underpin long-term livelihood resilience.

More broadly, the experience highlights an important lesson for rural development: community institutions can function not only as platforms for social mobilisation, but also as engines of local economic development. When collective action, entrepreneurship, and market integration are aligned within a supportive institutional framework, smallholder farmers can participate more effectively in value chains and capture greater value from their livelihoods.

In this sense, the AAPC model offers a replicable pathway for transforming fragmented rural production into coordinated, market-oriented livelihood systems capable of supporting more inclusive and resilient rural economies.

Building an Inclusive Rural Enterprise Ecosystem through Arecanut Leaf Value Chains



Executive Summary

Rural development interventions often struggle to generate sustainable employment because they promote skills or enterprises without simultaneously addressing the institutional, financial, technical, and market constraints that determine long-term enterprise viability. Limited access to productive assets, enterprise finance, quality assurance, and reliable markets continues to restrict the growth of first-generation rural entrepreneurs, particularly women and marginalised communities.

Tamul Plates Marketing Private Limited addresses these challenges through an integrated enterprise ecosystem that transforms naturally shed arecanut leaf sheaths into biodegradable tableware while enabling community-owned rural enterprises to participate in competitive markets. Rather than promoting arecanut leaf plate production as a standalone livelihood activity, the organisation combines decentralised production with centralised quality assurance, aggregation, branding, logistics, and market access. This allows entrepreneurs to retain ownership of productive assets while benefiting from shared commercial infrastructure.

Evidence indicates increased household incomes, expanded women's economic participation, improved access to formal enterprise finance, successful transition from grant-supported enterprises to conventional bank credit, and the development of a commercially functioning rural manufacturing network. The decentralised production model also demonstrated resilience during periods of economic disruption by enabling enterprises to continue operating while remaining integrated with organised markets.

The principal best practice emerging from the intervention lies in its emphasis on building an enabling enterprise ecosystem rather than delivering livelihoods directly. By integrating entrepreneurship, finance, technology, quality assurance, and market access within a commercially viable value chain, Tamul demonstrates how locally available biological resources can support inclusive rural industrialisation through community-owned enterprises.

Context and Development Challenge

The development challenge addressed by Tamul extends beyond unemployment alone. It lies at the intersection of rural economic exclusion, underutilised natural resources, and fragmented market systems.

Across Northeast India, particularly in rural and tribal regions, employment opportunities outside agriculture remain limited. Industrial development has progressed slowly due to weak industrial infrastructure, geographic remoteness, fragmented markets, and logistical constraints. Consequently, many households continue to depend on subsistence agriculture, supplemented by irregular wage labour or seasonal migration. These constraints disproportionately affect women, whose access to income-generating opportunities is often limited by household responsibilities, mobility constraints, and prevailing socio-cultural conditions.

At the same time, the region possesses extensive arecanut plantations that generate large quantities of naturally shed leaf sheaths with little commercial value. Although this renewable biomass is available in abundance, rural communities have historically lacked the technology, enterprise capabilities, and market linkages required to convert it into value-added products. The challenge, therefore, was not one of resource scarcity but of unlocking the economic potential of an underutilised natural resource.

Simultaneously, the growing demand for biodegradable alternatives to disposable plastic and Styrofoam tableware presented a significant market opportunity. Together, these conditions created the potential to connect an abundant local resource with an expanding market through value addition, thereby addressing both rural livelihood constraints and environmentally unsustainable consumption patterns.

Key Problem Indicators at Baseline

- Limited non-farm employment opportunities and continued dependence on agriculture and casual labour
- Limited access to safe and locally available income-generating opportunities
- Large quantities of naturally shed arecanut leaf sheaths remained underutilised
- Absence of technology, finance, quality assurance, and organised market access
- Individual entrepreneurs faced difficulty accessing enterprise credit
- Growing dependence on disposable plastic and Styrofoam tableware

Intervention Design and Approach

Sustainable rural enterprise development requires more than introducing an income-generating activity. The long-term viability of rural enterprises depends on entrepreneurs having simultaneous access to productive assets, enterprise finance, appropriate technology, technical support, quality assurance, and reliable markets. Weakness in any one of these components can undermine the commercial sustainability of the enterprise.

To address these interconnected constraints, Tamul designed an integrated value-chain model in which production remains decentralised and community-owned, while specialised commercial functions are centrally coordinated. Rather than functioning as a producer, the organisation serves

as an enterprise ecosystem facilitator by enabling rural entrepreneurs to own and operate production units while providing the institutional and market support required for them to compete in larger markets. Centralised functions such as quality assurance, aggregation, branding, logistics, and market development complement decentralised production, allowing entrepreneurs to retain ownership of productive assets while benefiting from shared commercial infrastructure.

Entrepreneur-first mobilisation

A distinguishing feature of Tamul's approach is its entrepreneur-first philosophy. Unlike many rural livelihood programmes that begin by forming groups and subsequently identifying economic activities, Tamul first identifies individuals demonstrating entrepreneurial motivation and a willingness to operate an enterprise. Collective structures are introduced only where access to productive assets is constrained by finance.

Under this approach, entrepreneurs requiring financial support are organised into Joint Liability Groups (JLGs), enabling five members to jointly access formal bank credit for purchasing production machinery. While the loan and productive asset are jointly financed, enterprise operations and income remain individual. Each entrepreneur is responsible for her own production and earnings, ensuring that financial risk is shared without weakening individual ownership, accountability, or incentives. This approach enables women who would otherwise struggle to access enterprise finance to become owners of productive assets while avoiding many of the coordination challenges associated with conventional collective enterprise models.



Figure 9 A raw material awareness camp in progress

Building an integrated enterprise ecosystem

The intervention combines several mutually reinforcing components that collectively strengthen enterprise viability. Commercially suitable locations are identified through systematic feasibility assessments before enterprise promotion begins. Entrepreneurs are then supported to access formal finance through bank linkages and government credit schemes, reducing barriers to productive asset ownership. Beyond enterprise establishment, Tamul provides technical training, production planning, preventive maintenance, quality guidance, and continuous business support throughout the operational lifecycle. Finally, decentralised producers are integrated into larger domestic and international markets through centralised systems for quality assurance, aggregation, branding, packaging, logistics, and market development.

Implementation Mechanism

Rather than expanding uniformly across all villages possessing arecanut plantations, Tamul follows a phased implementation process that gradually establishes commercially viable enterprise clusters. The process integrates feasibility assessment, community mobilisation, entrepreneur selection, enterprise financing, capacity building, and continuous post-establishment support.

Phases of Implementation

Phases	Activities Undertaken	Purpose
Feasibility Assessment	Identification of dense arecanut plantation areas through desk research, followed by field verification of raw material availability, transport connectivity, electricity infrastructure, transformer capacity, water availability, demographics and community readiness.	To identify commercially viable locations capable of supporting sustainable enterprise clusters.
Community Mobilisation and Awareness	Engagement with village leaders, Panchayats, SHGs, CLFs, religious leaders and opinion leaders; awareness programmes demonstrating commercial utilisation of arecanut leaf sheaths.	To generate awareness, build community confidence and identify interested entrepreneurs.
Entrepreneur Identification and Screening	Applications invited from interested individuals followed by household visits assessing motivation, socio-economic conditions, repayment history and entrepreneurial potential.	To select entrepreneurs with the commitment required for long-term enterprise operation rather than short-term participation.
Enterprise Financing	Support for bank linkage, CIBIL assessment, PMEGP applications and formation of JLGs where individual credit access is constrained.	To improve access to productive assets while reducing financial barriers to enterprise ownership.
Enterprise Establishment and Capacity Building	Installation of machinery, technical training, production planning, quality standards, preventive maintenance training and enterprise management support.	To prepare entrepreneurs for commercially viable production.

Operational Support and Market Integration	Fortnightly procurement, centralized quality control, packaging, branding, logistics, technical troubleshooting, maintenance support and assured market linkage.	To sustain enterprise performance and integrate decentralized producers into national and international markets.	Evidence - based cluster
--	--	--	--------------------------

er selection

Following preliminary desk-based mapping of arecanut-growing areas, feasibility assessments are undertaken to evaluate raw material availability, transport connectivity, electricity infrastructure, water availability, and community readiness. These assessments identify commercially viable production clusters while establishing baseline information for subsequent monitoring of socio-economic change. Villages that do not meet the required commercial or infrastructural conditions are excluded before investments are made.

Community mobilisation and entrepreneur selection

Once suitable villages have been identified, Tamul undertakes community awareness programmes to introduce the commercial potential of arecanut leaf plate production and encourage local participation. Interested individuals submit applications, followed by household-level assessments examining socio-economic conditions, entrepreneurial motivation, previous credit behaviour, and long-term commitment to enterprise management. This screening process ensures that enterprise support is directed towards individuals with the capacity and motivation to operate commercially viable enterprises.

Enterprise establishment and capacity building

Selected entrepreneurs receive support appropriate to their financial circumstances. Individuals able to independently access formal credit are assisted through bank linkages, while those facing financial constraints are supported through JLG-based financing arrangements. Following installation of production units, entrepreneurs receive practical training covering machine operation, production techniques, quality standards, preventive maintenance, raw material management, and production planning. Technical support continues beyond the training period through routine maintenance visits, telephone-based troubleshooting, and field-level assistance whenever required.

Decentralised production with centralised market support

Manufacturing is undertaken through decentralised, community-owned enterprises, enabling local ownership, home-based employment, and reduced transportation costs for raw materials. Functions requiring economies of scale—including quality inspection, aggregation, packaging, branding, and logistics—are managed centrally by Tamul. Finished products are procured on a fortnightly basis, inspected against quality standards, and supplied to domestic and international buyers, while producers receive continuous feedback to improve product quality. This implementation architecture enables geographically dispersed community enterprises to operate collectively within an integrated commercial value chain.

Outcomes and Observable Changes

The intervention has generated outcomes extending beyond enterprise creation, with evidence of changes in entrepreneurship, women's economic participation, household resilience, financial inclusion, market integration, and enterprise resilience. Success is assessed not by the number of enterprises established but by sustained enterprise operation, income growth, and long-term commercial viability.

Expansion of Rural Entrepreneurship and Household Livelihoods

One of the most significant outcomes has been the emergence of first-generation rural entrepreneurs rather than wage earners. Entrepreneurs own their production units, invest in productive assets through formal bank finance, manage enterprise operations, and earn income directly from production. This represents a shift from conventional livelihood programmes, where beneficiaries often remain dependent on externally funded assets or continuous programme support.

Interview evidence further suggests that increased and relatively stable enterprise income has strengthened household resilience by enabling families to meet expenditures that were previously difficult to finance through subsistence agriculture or irregular wage labour. For example, Protima Rabha financed a substantial portion of her cancer treatment through savings accumulated from arecanut leaf plate production. Similarly, Alpana Rabha, a sole breadwinner supporting a family of 5, utilised enterprise income to fund the continued education of her daughters, one of whom is now pursuing higher education while the younger remains in school. These examples illustrate how sustained enterprise income can improve household wellbeing by expanding access to healthcare, education, and greater financial security.



Figure 10 Protima Rabha proudly announced that she was able to turn around her 1 rupee to 1Lakh rupees in just a year

Women's Economic Participation and Financial Inclusion

Women constitute the primary participants in the intervention, with the Joint Liability Group (JLG) model enabling access to formal credit for productive assets while supporting individual enterprise ownership. Beyond facilitating economic participation, the intervention has enabled women to

become owners and managers of productive enterprises operating within the formal financial system.

According to the organisation, JLGs established under the intervention have maintained loan repayments over a three-year period without missing instalments, reflecting both financial discipline and the commercial viability of the enterprises. The gradual transition of entrepreneurs from subsidised government credit schemes to conventional bank finance further indicates growing institutional confidence in the model.



Figure 11 A member of the Sudemsri Dhakua Udyog (a 5 member JLG) operating her arecanut leaf plate making machine in her time slot

Market Integration and Enterprise Growth

Beyond household-level outcomes, the intervention has contributed to the development of a commercially functioning rural manufacturing ecosystem. Supporting documentation indicates that Tamul has progressively expanded its production network, established multiple rural clusters, promoted more than 200 micro-enterprises across Northeast India, created several thousand livelihood opportunities, developed international markets, and established a modern production and quality-control facility.

The intervention has therefore moved beyond enterprise promotion to establish a commercially viable rural value chain.

Enterprise Resilience

An important outcome became evident during the COVID-19 pandemic. While disruptions affected

the central processing facility, decentralised village-level production continued because entrepreneurs retained access to locally available raw materials and home-based production facilities. This enabled participating households to maintain income during a period of widespread economic uncertainty.

According to the organisation, community perceptions also shifted during this period. Initial scepticism regarding the commercial value of arecanut leaf sheaths reportedly gave way to increased participation as villagers observed producers continuing to generate income despite broader economic disruption. The experience demonstrated the resilience of a decentralised production system in which enterprise continuity does not depend upon a single manufacturing facility.



Figure 12 Arecanut sheaths collected from dense arecanut plantations

Assessment Across Analytical Dimensions

The Tamul intervention demonstrates strengths across all five analytical dimensions adopted for this compendium. While each dimension contributes independently to enterprise performance, the intervention's distinguishing feature lies in the way institutional arrangements, technology, finance, markets, community participation, and environmental sustainability operate as mutually reinforcing components of an integrated enterprise ecosystem. The assessment below examines both the contribution of individual dimensions and the interactions among them.



Institutional Dimensions 	Institutional sustainability is strengthened through a distributed enterprise ecosystem in which responsibilities are shared across entrepreneurs, Joint Liability Groups (JLGs), banks, Farmer Producer Companies (FPCs), and Tamul. Producers own productive assets, financial institutions provide enterprise credit, Tamul facilitates training, procurement, quality assurance, and market access, while producer organisations increasingly coordinate cluster-level activities. This distribution of roles reduces dependence on any single actor, strengthens institutional resilience, and supports the long-term sustainability of the enterprise ecosystem.
Technical Dimensions	Technical performance is strengthened through the integration of appropriate technology with continuous enterprise support. The intervention combines relatively simple hydraulic heat-press technology with training, preventive maintenance, troubleshooting, quality assurance, and standardised production systems. This enables first-generation entrepreneurs operating decentralised home-based enterprises to consistently meet commercial production and quality standards.
Social Dimensions	The intervention strengthens social inclusion by deliberately promoting entrepreneurship among women and rural youth while reducing barriers to enterprise ownership through shared-risk financing. Rather than positioning participants as beneficiaries, the model encourages ownership, financial responsibility, and independent enterprise management. The entrepreneur-first approach reinforces individual agency, while the JLG mechanism provides collective support without diluting individual incentives.
 Innovation	The intervention's principal innovation lies not in manufacturing technology but in institutional design. By integrating entrepreneur selection, shared-risk finance, decentralised production, centralised quality assurance, assured procurement, and market development into a single enterprise ecosystem, Tamul addresses multiple market failures simultaneously. The Joint Liability Group model represents a particularly significant institutional innovation by enabling productive asset ownership among women who would otherwise face limited access to



	conventional enterprise finance.
Ecological Sustainability	Ecological sustainability emerges as an important co-benefit rather than the primary objective of the intervention. By converting naturally shed arecanut leaf sheaths into biodegradable tableware, the model creates economic value from agricultural residue while contributing to reduced dependence on plastic and Styrofoam disposables. Environmental benefits are therefore embedded within a commercially viable enterprise model rather than relying on external environmental incentives or subsidies.

Interactions across analytical dimensions

The intervention's effectiveness lies not in any single component but in the interaction of all five analytical dimensions. Institutional arrangements reduce financial and market risks, enabling first-generation entrepreneurs to establish viable enterprises. Technical support and quality assurance enable decentralised producers to consistently meet commercial standards, strengthening buyer confidence and market access. Successful market participation generates sustained household income, reinforces entrepreneurial motivation, improves loan repayment performance, and increases the willingness of financial institutions to finance additional enterprises.

The productive utilisation of naturally shed arecanut leaf sheaths embeds environmental sustainability within a commercially viable enterprise model, aligning ecological and economic objectives. Collectively, these interactions demonstrate that Tamul's success stems from the deliberate integration of institutional innovation, appropriate technology, inclusive finance, market linkages, community ownership, and sustainable resource use into a coherent enterprise ecosystem, making it a strong example of integrated rural enterprise development.

Scalability and Replicability Potential

The Tamul intervention demonstrates considerable potential for replication beyond the immediate context of arecanut leaf plate production. However, the evidence suggests that what is most readily replicable is not the product itself, but the enterprise ecosystem that enables rural producers to participate competitively in markets.

The intervention illustrates how locally available natural resources can be transformed into commercially viable enterprises when production, finance, technology, quality assurance, and market access are designed as an integrated system rather than isolated interventions. In this sense, Tamul's experience offers broader lessons for rural industrialisation and market-system development in regions characterised by abundant natural resources but limited value addition.

Commercial sustainability depends on the simultaneous functioning of multiple interdependent components that together form an integrated enterprise ecosystem. The model is designed as a plug-and-play framework that delivers results only when implemented in its entirety. Core functions such as including entrepreneur financing, technical support, quality assurance, assured procurement, and market facilitation, are structurally interdependent, and modifying or omitting any one of them would disrupt the integrity of the model and weaken enterprise viability. Context-specific adaptations, such as entrepreneur selection, institutional partnerships, or implementation modalities, may be made where necessary, provided they preserve the underlying design logic of

the enterprise ecosystem.

Factors Supporting Scalability and Replicability

Factor	Contribution to Scalability
Abundant local raw material	Naturally available arecanut leaf sheaths provide a renewable and low-cost raw material base, reducing dependence on externally procured inputs.
Decentralised production model	Home-based production units enable expansion without requiring large capital investments in centralised manufacturing infrastructure.
Entrepreneur-owned enterprises	Ownership of productive assets by entrepreneurs reduces long-term dependence on project funding while encouraging commercial decision-making.
Joint Liability Group financing	Shared-risk financing lowers barriers to productive asset ownership, particularly for women and first-generation entrepreneurs unable to independently access formal credit.
Continuous technical support	Regular maintenance, troubleshooting, quality guidance and production planning reduce enterprise failure during the early stages of operation.
Centralised quality assurance and aggregation	Standardised quality inspection, packaging and logistics enable geographically dispersed micro-enterprises to collectively meet commercial buyer requirements.
Assured market access	Product procurement and established buyer networks reduce market uncertainty, allowing entrepreneurs to focus on production rather than marketing.
Formal banking partnerships	Integration with formal financial institutions creates opportunities for expansion beyond grant-based financing, improving long-term sustainability.

The intervention is particularly relevant for regions possessing underutilised biological resources capable of supporting value-added manufacturing. While the specific product may vary according to local ecological conditions, the underlying principles demonstrated by Tamul: enterprise ownership, shared-risk finance, decentralised production, centralised quality management, and market facilitation, are applicable across a wider range of rural enterprises.

However, the available evidence also suggests that successful replication requires several enabling conditions.

First, the intervention depends upon a commercially viable market capable of absorbing production at remunerative prices. Enterprise creation without corresponding market development would likely result in unsold inventories and declining producer confidence.

Second, technical support cannot be treated as a one-time training exercise. Continuous maintenance, quality feedback, production planning, and operational troubleshooting remain essential for maintaining product quality and enterprise performance over time.

Third, financial institutions must possess sufficient confidence in enterprise viability to extend credit. Within the Tamul model, this confidence is strengthened by the organisation's buyback commitment, reducing perceived lending risk for banks and facilitating access to productive assets.

Finally, entrepreneur selection emerges as a critical determinant of long-term success. The intervention deliberately prioritises individuals demonstrating entrepreneurial motivation before forming Joint Liability Groups. According to the organisation, this sequencing distinguishes the

model from conventional group-based livelihood programmes and contributes significantly to commercial sustainability and successful loan repayment.

The evidence therefore indicates that replication is most likely to succeed where implementation agencies are capable of facilitating an integrated enterprise ecosystem rather than delivering isolated livelihood activities. The intervention highlights that sustainable rural industrialisation requires simultaneous investment in institutions, finance, technology, markets, and entrepreneurship.

Key Insights and Constraints

The Tamul intervention offers important lessons for organisations seeking to promote sustainable rural enterprise development. The table below summarises the principal strengths of the intervention alongside the key constraints that may influence future scaling and replication.

Key Insights / What Worked	Key Constraints
Market systems matter more than enterprise creation alone. Enterprise development becomes commercially sustainable when production is embedded within an integrated ecosystem providing finance, technical support, quality assurance, logistics, and market access.	Working capital requirements. While production units are commercially viable, sustained working capital remains a challenge for Tamul as the coordinating enterprise responsible for procurement, aggregation, and market expansion.
Entrepreneur-first mobilisation strengthens enterprise sustainability. Selecting motivated entrepreneurs before forming Joint Liability Groups preserves individual incentives while enabling collective access to productive assets.	Time-intensive cluster development. Identifying suitable entrepreneurs, building trust, facilitating finance, and establishing commercially viable production clusters require considerable time and sustained field engagement.
Shared-risk financing expands enterprise ownership. The Joint Liability Group mechanism enables women and financially constrained entrepreneurs to own productive assets that would otherwise remain inaccessible.	Dependence on market growth. Expansion ultimately depends upon continued growth in demand for biodegradable tableware and Tamul's ability to diversify markets while maintaining competitive quality standards.
Ownership encourages accountability. Because entrepreneurs own both the enterprise and the associated loan obligation, incentives for productivity, maintenance, and repayment are significantly strengthened.	Need for continuous technical support. Enterprise sustainability depends upon ongoing maintenance, quality monitoring, and production guidance rather than one-time capacity building.
Quality assurance enables market expansion. Centralised quality control allows decentralised micro-enterprises to collectively satisfy the consistency required by larger commercial buyers.	Context-specific raw material availability. While the institutional model has wider applicability, arecanut leaf plate production remains geographically dependent on the availability of sufficient raw material.

Opportunities for Convergence and Collaborative Scaling

The Tamul model demonstrates significant opportunities for convergence among public institutions, financial institutions, civil society organisations, producer organisations, and private sector actors. Scaling the model across larger geographies would require each stakeholder to contribute complementary capabilities across the enterprise value chain.

Community-based organisations can play a critical role during the early stages of implementation

by building community trust, identifying motivated entrepreneurs, and facilitating local mobilisation. Such partnerships can improve entrepreneur selection while reducing the transaction costs associated with expansion into new locations.

As production networks mature, producer organisations and Farmer Producer Companies can assume greater responsibility for cluster-level coordination, aggregation, and local enterprise support, enabling Tamul to focus on quality assurance, product development, branding, and market expansion.

At the policy level, existing government programmes supporting rural livelihoods, women's entrepreneurship, micro-enterprises, and skill development can be leveraged to strengthen access to finance, infrastructure, entrepreneurship development, and capacity building, thereby facilitating the expansion of similar enterprise ecosystems without creating parallel institutional arrangements.

Conclusion

The Tamul intervention demonstrates that sustainable rural enterprise development depends not merely on promoting livelihoods or distributing productive assets, but on creating the institutional conditions that enable enterprises to compete in organised markets. By integrating entrepreneur identification, shared-risk financing, technical support, decentralised production, quality assurance, and assured market access, the model addresses many of the structural constraints that limit the growth of first-generation rural enterprises.

A defining feature of the intervention is its emphasis on market creation rather than market linkage. Instead of expecting individual producers to identify buyers, maintain quality standards, manage logistics, or negotiate commercial relationships, Tamul coordinates these functions through an integrated value chain that enables decentralised community enterprises to participate in larger domestic and international markets. In doing so, it transforms rural producers from suppliers of raw materials into owners of commercially viable enterprises.

By converting naturally shed arecanut leaf sheaths into biodegradable tableware, the intervention demonstrates that environmental sustainability and rural industrialisation can reinforce one another through commercially viable enterprise. More broadly, Tamul illustrates how locally available biological resources can support inclusive rural industrialisation when combined with appropriate institutions, finance, technology, and markets. Rather than offering a replicable product, it presents a replicable enterprise ecosystem capable of informing future efforts to build resilient, market-oriented, and environmentally sustainable rural economies.

Strengthening Last-Mile Livestock Service Delivery through a Community-Owned Enterprise in Bechimari, Assam



Executive Summary

Livestock farming is central to rural livelihoods across Assam, yet fragmented access to quality inputs, veterinary medicines, technical advisory, preventive animal healthcare, and enterprise support continues to constrain productivity and the commercial growth of smallholder livestock enterprises. To address these systemic gaps, Ayanant Ventures Pvt. Ltd., in partnership with SWRANG Women Producer Cooperative Society Limited (SWPCSL), established the UnnatFarm Centre at Bechimari, Udalguri district, as a Village-Level One-Stop Farming Solution Centre. Rather than functioning as a conventional agri-input outlet, the Centre integrates quality farm inputs, scientific advisory, preventive animal healthcare, enterprise guidance, capacity building, and community-based extension within a single village-level platform.

The distinguishing feature of the intervention is its institutional design. Rather than creating a parallel service delivery mechanism, the model strengthens a women-led producer cooperative to function as a community-owned rural service enterprise, expanding its role beyond aggregation and collective marketing while enhancing its long-term institutional sustainability.

Although still at an early stage, the intervention has demonstrated encouraging operational viability and community acceptance. Within approximately one month of commencing operations, the Centre recorded a business turnover exceeding ₹4 lakh while improving local access to essential livestock products and scientific advisory and preventive animal healthcare.

The UnnatFarm model represents a promising institutional approach to strengthening last-mile livestock service delivery. Although longer-term impacts on productivity and livelihoods remain to be established, the early experience demonstrates how community-owned producer institutions can combine commercial sustainability with technical service delivery. The model therefore offers a credible framework that may inform similar efforts by producer organisations, cooperatives, and Farmer Producer Organisations (FPOs) in comparable rural contexts.

Context & Development Challenge

Livestock farming constitutes an integral component of rural livelihoods across Assam, contributing significantly to household income, nutritional security, employment generation, and financial resilience. Beyond supplementing agricultural incomes, livestock provides a critical safety net for smallholder and marginal farming households by offering regular cash flow and livelihood diversification. Consequently, strengthening livestock-based enterprises has emerged as an important pathway for enhancing rural incomes and promoting inclusive economic development.

This importance is particularly evident in the Bodoland Territorial Region (BTR) of Assam, where livestock rearing forms an integral part of integrated crop-livestock production systems. The region possesses considerable potential for livestock-based economic development owing to favourable agro-climatic conditions, abundant natural resources, and widespread community participation in cattle, piggery, poultry, and goat rearing. However, despite this potential, livestock productivity and enterprise growth continue to remain constrained by systemic gaps in rural service delivery.

Smallholder livestock farmers frequently face difficulties in accessing quality feed, veterinary medicines, scientific advisory services, preventive animal healthcare, and enterprise guidance within their own villages. Inputs are often procured from distant markets, veterinary services remain sporadic or inaccessible, and opportunities for technical capacity building are limited. These challenges increase production costs, delay timely farm management decisions, reduce animal productivity, and expose farmers to avoidable disease outbreaks and financial losses.

More fundamentally, these constraints reflect the absence of an integrated, locally accessible livestock service system, not merely isolated shortages of individual services. Farmers require coordinated and continuous support delivered through a trusted local institution rather than fragmented service providers. In the absence of such an ecosystem, livestock enterprises remain fragmented, limiting both productivity improvements and commercial growth.

Existing producer organisations and cooperatives possess strong community networks and institutional legitimacy but are often confined to aggregation and collective marketing functions. Their potential to serve as locally owned platforms for delivering commercial services, technical support, and community extension remains largely underutilised. At the same time, standalone private retailers frequently lack the institutional capacity or development orientation required to address broader ecosystem challenges beyond input sales.

The central development challenge therefore extended beyond improving farmers' access to livestock inputs. It required an institutional mechanism capable of delivering coordinated livestock services through a locally accessible and sustainable community platform. The following intervention was designed to address this systemic gap.

Intervention Design & Approach

Recognising that improving livestock productivity required more than expanding access to agricultural inputs, Ayanant Ventures Pvt. Ltd. designed the UnnatFarm model as an integrated last-mile livestock service ecosystem anchored within a community-owned institution. The intervention was founded on a simple but important premise: farmers are more likely to adopt scientific livestock practices and operate commercially viable enterprises when quality inputs, technical knowledge, preventive healthcare, and business support are available through a single, locally accessible platform rather than multiple fragmented service providers.

The model was implemented through a partnership with SWRANG Women Producer Cooperative Society Limited (SWPCSL), a women-led producer cooperative embedded within the local community. By anchoring the Centre within an existing producer institution, the intervention sought to strengthen local ownership while expanding the cooperative's role in rural service delivery.



Figure 13 Awareness camp with SWPCSL

The intervention was conceptualised around four interrelated design principles.

Strengthening Last-Mile Livestock Service Delivery

The first principle was to reduce the physical and institutional barriers that prevented farmers from accessing essential livestock services. The UnnatFarm Centre was established as a Village-Level One-Stop Farming Solution Centre, bringing together livestock feed, veterinary medicines, vaccines, nutritional supplements, farm equipment, and selected agricultural inputs within a single location. By reducing the need for farmers to travel to distant markets and engage with multiple suppliers, the model lowers transaction costs while improving timely access to quality products essential for livestock production.

Integrating Commerce with Advisory and Extension Services

Livestock productivity depends not only on access to quality inputs but also on farmers' ability to apply scientific knowledge and make informed management decisions. Accordingly, the UnnatFarm Centre integrates commercial services with technical advisory on animal nutrition, breeding, housing, preventive healthcare, biosecurity, enterprise planning, and business management. Capacity-building programmes, demonstrations, awareness campaigns, and community-based extension through UnnatFarm Mitras complement commercial operations, enabling the Centre to function as both a business

enterprise and a local knowledge hub.

Institutional Strengthening Through Community Ownership

A defining feature of the model is its emphasis on institutional development. By strengthening the operational and managerial capacities of SWPCSL, the intervention enables the cooperative to expand beyond aggregation and collective marketing into a diversified rural service institution. This institutional strengthening enhances the cooperative's long-term sustainability while improving its ability to deliver coordinated livestock services.

Building an Integrated Village-Level Service Platform

The intervention links commercial services, technical advisory, enterprise support, and institutional capacity within a single operational framework. By connecting these complementary functions, the Centre provides farmers with coordinated support while strengthening the cooperative's long-term operational sustainability.



Figure 14 Training members of Maa Chandika FPC, Chaygaon on scientific methods of poultry farming

Implementation Mechanism

The UnnatFarm model was implemented through a partnership-based approach that combined technical expertise with community ownership. Rather than establishing an externally managed service centre, the intervention sought to strengthen the institutional capacity of an existing women-led producer cooperative while leveraging the technical and business expertise of Ayanant Ventures Pvt. Ltd. This implementation strategy embedded service delivery within a locally governed institution capable of sustaining operations beyond the initial establishment phase. The implementation process evolved through four interconnected stages, each designed to

establish not only the physical infrastructure of the Centre but also the institutional systems required for effective and sustainable service delivery.

Phase I: Institutional Partnership and Governance

The intervention began with the establishment of a strategic partnership between Ayanant Ventures Pvt. Ltd. and SWRANG Women Producer Cooperative Society Limited (SWPCSL). The partnership defined complementary roles and responsibilities, with Ayanant Ventures providing technical leadership, business mentoring, supply chain management, and operational guidance, while SWPCSL assumed responsibility for local management, community mobilisation, financial operations, and day-to-day service delivery.

Phase II: Establishment of the Village-Level Service Centre

The second phase focused on establishing the UnnatFarm Centre as a fully functional Village-Level One-Stop Farming Solution Centre. Appropriate infrastructure was developed to stock and distribute quality livestock feed, veterinary medicines, vaccines, nutritional supplements, farm equipment, and other agricultural inputs. Alongside physical infrastructure, operational systems for procurement, inventory management, quality assurance, and product handling were introduced to ensure the consistent availability of quality products and efficient business operations.

Phase III: Capacity Building and Institutional Strengthening

Recognising that sustainable service delivery depends as much on human capacity as on infrastructure, the intervention invested in strengthening the technical and managerial capabilities of those responsible for operating the Centre. Training programmes were conducted for cooperative representatives, UnnatFarm Mitras, and field personnel on livestock management, product knowledge, customer engagement, inventory management, business operations, and farmer advisory services.

Phase IV: Integrated Service Delivery

Following establishment and capacity building, the Centre commenced operations through an integrated service delivery model. Farmers could access quality livestock inputs alongside scientific advisory, enterprise planning, veterinary guidance, awareness programmes, and community-based extension services from a single institutional platform. These services were delivered as an integrated package in which access to quality products was complemented by technical guidance and enterprise support.

Collaborative Institutional Architecture

The implementation model is built on complementary roles within a shared governance framework. Ayanant Ventures Pvt. Ltd. provides technical backstopping, business mentoring, innovation, and supply chain management; SWPCSL anchors community ownership and operational management; UnnatFarm Mitras serve as the interface between the Centre and farming households through village-level outreach and advisory support; veterinary professionals contribute specialised technical expertise and preventive animal healthcare services; and farmers participate through training programmes, adoption of improved practices, and continuous feedback that informs service delivery.

Early Outcomes and Emerging Evidence of Change

As a recently established intervention, the UnnatFarm Centre is still in the early stages of implementation. Accordingly, this assessment focuses on early evidence of operational viability, institutional traction, and community acceptance rather than longer-term impacts on livestock productivity, household incomes, or livelihood resilience, which will require sustained observation over time.

Early Evidence of Commercial Viability

One of the clearest indicators of the model's early performance is its rapid commercial uptake. Within approximately one month of commencing operations, the UnnatFarm Centre recorded a business turnover exceeding ₹4 lakh, reflecting strong demand for reliable, locally accessible livestock products and services. While turnover alone is not a measure of development impact, it indicates strong farmer acceptance of the integrated service model and strengthens the financial sustainability of the community institution responsible for managing the Centre, reducing dependence on project-based support and creating opportunities for continued service expansion.

Improved Access to Essential Livestock Services

The establishment of the Centre has begun addressing one of the most immediate constraints faced by livestock producers: access to quality products and technical services within their own locality. Farmers now have a single point of access for livestock feed, veterinary medicines, vaccines, nutritional supplements, equipment, scientific advisory, and enterprise guidance, reducing the need to rely on multiple suppliers or travel outside the village to procure essential inputs. Access to these services has therefore become substantially more localised and coordinated.



Figure 15 BOD of Darrangi Women FPC, Mangaldai, buying nutri-mix mineral mixture

Strengthening Scientific Livestock Management

Early implementation has also strengthened farmers' exposure to scientific livestock management practices. Through technical advisory, awareness programmes, preventive healthcare messaging, and community-based extension, the Centre is promoting improved practices related to animal

nutrition, vaccination, disease prevention, biosecurity, and enterprise planning. By establishing a locally accessible platform for continuous technical support, the intervention has created favourable conditions for the progressive adoption of improved livestock management practices.

Emerging Institutional Transformation

An important early outcome is the strengthening of SWRANG Women Producer Cooperative Society Limited (SWPCSL) as a community-owned rural service institution. Beyond managing commercial operations, the cooperative has begun developing the organisational capabilities required to deliver advisory, extension, and enterprise support services, demonstrating the operational viability of the institutional model.

Building the Foundations for Long-Term Impact

The intervention has established the institutional and operational foundations required to pursue longer-term outcomes, including improved livestock productivity, stronger value chains, higher farm profitability, and enhanced livelihood resilience. At its current stage of implementation, the UnnatFarm Centre should therefore be understood as a credible proof of concept with the potential for sustained development impact as evidence accumulates over time.

Assessment Across Analytical Dimensions

The UnnatFarm intervention is assessed across five complementary analytical dimensions to examine its broader institutional, technical, social, innovative, and ecological significance. Rather than reiterating implementation activities or early outcomes, the assessment evaluates the intervention's contribution to addressing systemic constraints in last-mile livestock service delivery and its potential relevance for strengthening community-based rural development.

Institutional Dimension	The principal institutional contribution of the UnnatFarm model lies in demonstrating how an existing producer cooperative can evolve from a collective marketing organisation into a locally embedded rural service institution. By strengthening the functional and managerial capacities of SWRANG Women Producer Cooperative Society Limited (SWPCSL), the intervention expands the cooperative's role beyond aggregation and marketing to include the delivery of commercial services, technical advisory, farmer engagement, and enterprise support. This institutional evolution broadens the developmental role of the cooperative while strengthening its long-term organisational sustainability through revenue-generating operations. As the model matures, its continued success will depend on the cooperative's ability to maintain sound governance, financial viability, service quality, and technical capacity.
Technical Dimension	From a technical perspective, the intervention addresses a structural weakness that characterises many livestock development programmes—the separation of input supply from continuous advisory and extension support. By integrating quality products, scientific guidance, preventive animal healthcare, enterprise advisory, and community-based outreach within a single service ecosystem, the model creates opportunities for more informed and timely decision-making by farmers. Its technical strength therefore lies less in introducing new technologies than in improving the organisation and accessibility of existing technical services. If sustained over time, this integrated approach has the potential to improve the effectiveness of livestock extension by reducing fragmentation and promoting continuous engagement rather than isolated technical interventions.

Social Dimension	The intervention's primary social contribution lies in changing how farmers engage with livestock support systems. Rather than navigating multiple disconnected service providers, producers interact with a trusted community institution capable of providing products, technical guidance, and enterprise support through a single locally accessible platform. This strengthens institutional trust while improving the accessibility of scientific knowledge and professional services within the community. The intervention also demonstrates how a women-led producer cooperative can assume a broader leadership role within the local rural economy by managing a technically oriented service enterprise. While wider social outcomes—including changes in livelihoods, inclusion, and community resilience—will require longer-term assessment, the model has established important social foundations by strengthening local ownership and improving farmers' engagement with organised service delivery.
Innovation Dimension	The innovation of the UnnatFarm model lies not in introducing new livestock technologies but in redesigning how livestock services are organised and delivered. Conventional livestock development initiatives often provide input supply, technical advisory, preventive healthcare, enterprise support, and community extension as separate functions implemented by different agencies. In contrast, the UnnatFarm model integrates these complementary services within a single operational framework that combines commercial viability with continuous technical support and community ownership. By aligning enterprise development with service delivery through a locally governed institution, the model offers a systems-based alternative to fragmented livestock development approaches. This institutional architecture provides a coherent and potentially replicable framework for strengthening last-mile livestock service delivery in comparable rural contexts.
Ecological Sustainability Dimension	Ecological sustainability is an enabling rather than a demonstrated outcome of the intervention. The model promotes scientific livestock management, preventive animal healthcare, improved husbandry, and more efficient use of production inputs, all of which are consistent with environmentally responsible livestock production. However, the report does not provide evidence of measurable ecological impacts such as reduced emissions, improved resource conservation, or enhanced environmental resilience. At this stage, the intervention's ecological significance therefore lies in establishing an institutional platform through which sustainable livestock management practices can be promoted and progressively adopted as implementation matures.

Taken together, the five analytical dimensions demonstrate that the UnnatFarm intervention contributes more than the establishment of a village-level livestock service centre. Its principal significance lies in demonstrating how institutional strengthening, integrated technical services, commercial sustainability, and community ownership can be combined within a single producer-led enterprise to address persistent weaknesses in last-mile livestock service delivery. Although longer-term evidence will be required to assess its effects on productivity, livelihoods, and institutional resilience, the intervention has established a credible proof of concept that shifts the focus of livestock development from isolated service provision towards the creation of locally governed rural service ecosystems. In doing so, it offers an analytically robust and potentially scalable model for strengthening community-based.

Scalability & Replicability

The early experience of the UnnatFarm Centre suggests that the model has strong potential for replication because its core innovation lies in institutional design rather than location-specific infrastructure or specialised technology. By strengthening an existing producer cooperative to function as an integrated livestock service institution, the intervention addresses a common challenge faced across many rural areas—fragmented last-mile livestock service delivery. This institutional approach enhances the model's relevance for other contexts where community-based organisations possess established governance structures, local credibility, and strong farmer networks.

At the same time, successful replication should not be understood as simply establishing additional service centres. The effectiveness of the model depends on preserving the integrated institutional architecture that combines commercial operations, technical advisory, preventive animal healthcare, community-based extension, and local ownership within a single operational framework. The following factors are particularly important in supporting scalability and successful replication.

Factors Supporting Scalability & Replicability

Factor	How it Supports Scalability & Replicability
Existing Producer Institutions	The model builds upon existing producer cooperatives and Farmer Producer Organisations (FPOs), allowing replication through strengthening local institutions rather than creating parallel implementation structures.
Institutional Flexibility	The institutional approach can be adapted to different organisational capacities, livestock production systems, and local development contexts while retaining its core principles.
Modular Service Design	Services such as quality input supply, scientific advisory, preventive animal healthcare, enterprise guidance, and community-based extension can be introduced progressively according to local needs and institutional readiness.
Commercial Sustainability	Revenue generated through commercial operations provides a pathway for sustaining service delivery beyond project-based funding while supporting continued institutional development.
Community Ownership	Locally governed implementation strengthens community trust, institutional accountability, and farmer participation, creating conditions that support long-term operational continuity.
Technical Partnership and Capacity Building	Collaboration with technical partners provides access to specialised expertise, business mentoring, supply chain support, and continuous capacity building, enabling producer institutions to manage integrated livestock service enterprises effectively.
Transferability of the Institutional Model	The intervention addresses systemic gaps in last-mile livestock service delivery that are common across many rural areas, making the underlying institutional approach applicable beyond the immediate project location.
Critical Enabling Conditions	Successful replication will depend on capable local institutions, effective governance, reliable supply chains, continuous technical backstopping, trained extension personnel, and sustained community engagement. Replication without these institutional foundations risks reducing the model to a conventional agri-input retail outlet rather than an integrated rural service ecosystem.

The UnnatFarm model should therefore be viewed as a promising institutional framework for strengthening last-mile livestock service delivery rather than a location-specific intervention. As implementation matures, further evidence on institutional performance, financial sustainability, service quality, farmer adoption, and livelihood outcomes will strengthen the case for wider replication. Nevertheless, the early experience demonstrates that community-owned producer institutions can provide a credible foundation for delivering integrated livestock services through a commercially viable and locally governed enterprise model.

Key Insights & Emerging Lessons

Although the UnnatFarm Centre is at an early stage of implementation, its initial experience offers several important lessons for strengthening last-mile livestock service delivery through community-owned institutions. These lessons extend beyond livestock development and provide broader insights into the design of integrated rural service ecosystems.

- Addressing fragmented service delivery requires more than improving access to agricultural inputs. Integrating quality inputs, technical advisory, preventive healthcare, enterprise guidance, and community-based extension within a single institutional platform enables farmers to access complementary services more efficiently and supports more informed decision-making.
- Existing producer institutions can play a much broader role than aggregation and collective marketing. With appropriate technical support and organisational capacity building, they can evolve into locally embedded rural service institutions capable of delivering both commercial and developmental functions.
- Embedding service delivery within trusted local institutions strengthens ownership, accountability, and farmer participation, creating stronger foundations for the long-term continuity of rural development interventions.
- Commercial viability and developmental objectives can reinforce one another. Revenue-generating rural enterprises create opportunities to sustain service delivery and institutional development beyond project-based funding.
- Effective livestock extension depends on sustained access to scientific advisory and practical guidance rather than one-time training programmes. Integrating technical support into routine farmer engagement encourages continuous learning and gradual adoption of improved practices.
- Clearly defined partnerships that combine local institutional ownership with external technical expertise can strengthen implementation quality while building the long-term capacity of community institutions.
- The transferability of the model depends less on replicating physical infrastructure than on strengthening local institutions capable of coordinating integrated rural service delivery within their own contexts.

The early experience of the UnnatFarm Centre suggests that strengthening rural livestock systems is fundamentally an institutional challenge as much as a technical one. While longer-term evidence will be required to assess sustained impacts on productivity and livelihoods, the intervention demonstrates that community-owned institutions, when supported by appropriate technical partnerships and commercially sustainable service models, can provide an effective foundation for strengthening last-mile livestock service delivery.

The institutional design of the UnnatFarm Centre creates opportunities for convergence with government departments, producer organisations, financial institutions, research agencies, and technical partners working in livestock development. By serving as a community-owned last-mile service platform, the model can complement existing programmes through integrated delivery of quality inputs, technical advisory, preventive animal healthcare, enterprise support, and capacity building. As the model evolves, strategic partnerships can strengthen institutional capacity and expand service reach while preserving local ownership and community accountability.

Conclusion

The UnnatFarm Centre demonstrates an innovative institutional approach to strengthening last-mile livestock service delivery by positioning a producer cooperative as an integrated rural service institution. Although the intervention remains at an early stage, the initial experience suggests that this institutional model can improve farmers' access to essential livestock services while creating stronger foundations for long-term rural enterprise development.

As implementation matures, continued monitoring will be essential to assess sustained outcomes in productivity, livelihoods, institutional performance, and financial sustainability. Nevertheless, the UnnatFarm model offers a promising example of how community-owned producer institutions can strengthen rural livestock systems by combining commercial sustainability with locally accessible technical support and coordinated service delivery. In doing so, it provides a credible institutional framework that may inform similar efforts to strengthen last-mile livestock services through community-led rural enterprises.

From Waterlogged Land to Productive Livelihoods: Leveraging MGNREGA Farm Ponds for Rural Diversification in Udalguri



Executive Summary

Across rural Assam, farm ponds built under MGNREGA's Individual Beneficiary Scheme (IBS) often remain underutilized as passive water storage after excavation.

To bridge this gap, **KABIL** introduced a convergence-oriented model in Udalguri district, transforming standalone ponds into productive, climate-resilient livelihood hubs. Expanding from two Village Council Development Committees (VCDCs) in FY 2018–19 to 25 VCDCs across Udalguri and Mazbat blocks, the initiative focused on community mobilization, scheme facilitation, and post-construction support.

Key Impact & Outcomes

- **Asset Creation:** Supported the construction of ~700 MGNREGA farm ponds.
- **Livelihood Conversion:** Transformed nearly 400 ponds into active fisheries integrated with horticulture, irrigation, and livestock.
- **Reach:** Directly benefited over 20,000 people by converting waterlogged, unused lands into productive assets.

This initiative boosted household income, local nutrition, and climate resilience. The Udalguri model proves that with institutional convergence, technical handholding, and market linkages, infrastructure assets can drive long-term rural development rather than remaining simple one-off works.

Context and Development Challenge

The agrarian economy of Udalguri district is shaped by a combination of environmental, economic, and structural challenges. Agriculture remains the primary livelihood for a large proportion of rural households, yet productivity and income generation are constrained by fragmented landholdings, climatic variability, declining soil fertility, and the prevalence of low-lying and waterlogged lands that are often unsuitable for conventional cultivation.

These vulnerabilities disproportionately affect small and marginal farmers, many of whom belong to socially and economically disadvantaged communities. Seasonal fluctuations in agricultural income, limited access to productive assets, inadequate irrigation infrastructure, and restricted livelihood opportunities contribute to persistent economic insecurity. The increasing movement of rural youth towards non-farm employment further reflects the limited attractiveness and viability of agriculture as a livelihood pathway.

Within this context, water resource management assumes critical importance. Waterlogged lands are frequently viewed as agricultural constraints rather than productive opportunities, resulting in large areas of land remaining underutilized. Simultaneously, many farming households lack reliable water storage systems that could support irrigation, fisheries, horticulture, or climate-resilient livelihood activities. The IBS under MGNREGA provides an important opportunity to address these challenges by enabling the creation of productive assets on private lands belonging to eligible households.

The challenge therefore extended beyond asset creation itself. The central question was whether waterlogged and underutilized lands could be transformed into productive household assets capable of generating income, improving nutrition, supporting irrigation, and strengthening

Key Problem Indicators at Baseline

- Underutilization of low-lying and waterlogged lands.
- Limited livelihood diversification beyond traditional agriculture.
- Inadequate irrigation and water storage infrastructure.
- Seasonal income insecurity among small and marginal farmers.
- Limited access to productive assets among vulnerable households.
- Weak awareness regarding the livelihood potential of MGNREGA-supported assets.
- Increasing youth migration towards non-farm employment.
- Limited evidence on the long-term utilization and productivity of farm ponds constructed under MGNREGA.

resilience against climatic and economic shocks.

Intervention Design and Approach

KABIL approached the challenge through a facilitative and convergence-based model that sought to maximise the developmental potential of farm ponds constructed under MGNREGA.

Rather than viewing farm ponds solely as infrastructure assets, the intervention conceptualised them as entry points for livelihood diversification, natural resource management, and climate-resilient rural development. To generate meaningful outcomes, households needed support in accessing government schemes, understanding the productive potential of the assets, and integrating them into broader livelihood systems.

Beginning with two VDCs in FY 2018-19, the initiative gradually expanded across 25 VDCs in Udalguri and Mazbat blocks. The intervention focused on enabling eligible households to access MGNREGA-supported farm ponds while simultaneously building awareness around their potential applications.

The core design rested on four interrelated pillars:

Community Mobilisation and Demand Generation, Access to Public Entitlements, Productive Asset Creation, and Livelihood Activation.

Implementation Mechanism

The implementation process followed a layered approach involving community institutions, local governance structures, technical functionaries, and government systems.

Phase 1: Community Mobilisation and Awareness Generation

The process began with village-level engagement to build awareness regarding the IBS under MGNREGA and the livelihood potential of farm ponds.

Self Help Groups (SHGs), VDCs, and community leaders played a central role in identifying interested households, generating demand, and communicating the potential benefits of farm ponds for fisheries, irrigation, horticulture, and water conservation.

By positioning ponds as productive assets rather than merely public works, the intervention helped shift community perceptions regarding government-supported infrastructure.

Phase 2: Planning and Institutional Coordination

Once demand was generated, VDC-wise Annual Action Plans were prepared and approved through Gram Sabha processes.

These plans were subsequently consolidated at block and district levels before being submitted to the Bodoland Territorial Council (BTC) administration for final approval. Technical feasibility assessments were undertaken through collaboration between:

- Technical Assistants and Accredited Engineers,

- village-level functionaries,
- VCDC representatives,
- and local governance actors.

This ensured that asset creation remained embedded within established government systems while responding to local priorities.

Phase 3: Asset Creation Through MGNREGA

Construction was implemented through labour-intensive processes aligned with MGNREGA principles, creating wage employment opportunities for local job card holders during excavation and bund construction. The average investment per pond was approximately ₹1.5 lakh under MGNREGA norms, covering excavation, bund construction, and labour costs.

Over time, approximately 700 farm ponds were constructed across the intervention geography.

Importantly, KABIL did not directly implement the works. Instead, the organisation functioned as a facilitator and institutional bridge connecting communities with administrative systems, helping ensure that eligible households could access available government entitlements.

Phase 4: Livelihood Promotion and Productive Utilisation of the Asset

Following construction, KABIL encouraged productive utilisation through fisheries, horticulture, and irrigation. Approximately 400 of the 700 ponds created under the programme have already been converted into fishery-based livelihood systems, while efforts continue to support productive use of the remaining ponds.

Outcomes and Observable Changes

Productive Utilisation of Farm Ponds

One of the most significant outcomes of the intervention has been the transition of farm ponds from passive infrastructure assets into actively utilised livelihood resources.

Field assessments conducted across 35 beneficiary households in nine VCDCs indicated that a majority of households were using farm ponds for fish rearing, while others had integrated ponds into irrigation systems, horticulture activities, or mixed livelihood strategies.

Of the approximately 700 ponds created under MGNREGA across the intervention geography, nearly 400 have reportedly been converted into fishery-based livelihood systems.

Farm ponds enabled households to diversify beyond traditional paddy cultivation by incorporating fisheries, horticulture, and supplementary agricultural activities into existing livelihood systems.

This diversification reduced dependence on a single source of income and created opportunities for households to generate economic returns from previously underutilized lands.

Importantly, the intervention demonstrated that waterlogged lands need not remain economically unproductive. Instead, they can function as productive assets supporting multiple livelihood activities simultaneously.



Figure 16: A Farm pond under construction

Improved Household Nutrition

Several beneficiary households reported increased access to fish for household consumption.

While the intervention was not designed primarily as a nutrition programme, fish production contributed to household food security and dietary diversity, particularly among rural families that previously relied primarily on market purchases for fish consumption.

Expansion of Horticulture and Mixed Farming Systems

Around 60% of beneficiary households had begun utilising pond embankments for cultivation of:

Arecanut, Assam lemon, Banana, and seasonal vegetables.

The integration of fisheries with embankment cultivation increased the productive use of available land and encouraged more diversified farming systems.

In some cases, farm ponds also served as critical irrigation sources. During field visits, one of the beneficiaries, and a successful farmer, Mr. Robert Mochahari, who primarily uses his pond to support irrigation for agriculture and horticulture reported cultivation at its current scale would not have been possible without the availability of stored water from the pond. He currently cultivates fruits and vegetables across approximately 18 bighas of land, including pumpkin, areca nut, sugarcane, jujube, mango, litchi, maize, and dragon fruit. He reported earning more than ₹3 lakh in profit from pumpkin cultivation alone during the current year.

Such examples illustrate the broader developmental potential of farm ponds when integrated into diversified livelihood systems rather than treated solely as water-storage structures.



Figure 17 Farm Ponds used for irrigation, water storage, as well as fisheries

Income Supplementation

Although income records were generally informal and not systematically maintained, several households reported supplementary earnings through fish sales and related activities.

One beneficiary reportedly earned approximately ₹15,000 annually from fish sales and used the income to support children's education expenses.

While economic outcomes varied across households, the intervention demonstrated the potential of farm ponds to generate livelihood value beyond their original function as water-storage structures.

Increased Awareness of Productive Asset Creation

The intervention contributed to changing community perceptions regarding government schemes and public asset creation.

Beneficiaries increasingly viewed MGNREGA-supported infrastructure not merely as construction works but as opportunities to create long-term livelihood assets capable of generating economic and social benefits beyond the construction period.

At the same time, the assessment revealed that substantial livelihood potential remains unrealised due to technical, institutional, and behavioural constraints that continue to affect productivity.

Assessment Across Analytical Dimensions

Following the framework's conceptual structure, the farm pond intervention is assessed across five analytical dimensions and their interactions.

Institutional Dimensions	The institutional dimension represents one of the strongest features of the intervention. The model demonstrates how a national public works programme can be leveraged beyond wage employment and infrastructure creation to support long-term livelihood development. The intervention successfully mobilised and coordinated multiple institutional actors, including: MGNREGA administrative systems, Village Council Development Committees (VDCs), Gram Sabha institutions, SHGs & VOs, and communities. VDCs emerged as particularly important institutions for demand generation, beneficiary identification, local planning, and community mobilisation. However, there are some important institutional gaps. While convergence was effective during the asset-creation phase, post-construction convergence remained relatively weak. Limited engagement with fisheries departments, horticulture departments, and allied livelihood schemes constrained the ability of beneficiaries to maximise the productive potential of the assets. The intervention therefore demonstrates strong institutional convergence for asset creation but weaker convergence for long-term livelihood ecosystem development.
Technical Dimensions	From a technical perspective, the intervention successfully enabled construction of farm ponds and supported basic fishery activities. Field observations indicated that many beneficiaries had adopted semi-intensive fish culture practices involving species such as Rohu, Catla, Mrigal, Grass Carp, and Common Carp. However, the technical assessment revealed that infrastructure creation alone does not guarantee productive outcomes. Significant knowledge gaps persisted regarding:

	stocking density, pond preparation, feed management, disease prevention, species selection, and water management. Most households relied on indigenous knowledge systems that were often adequate for subsistence-level production but insufficient for maximising productivity and profitability. Additional technical challenges included: inadequate fencing, fish theft, embankment overflow during monsoon periods, seasonal drying, and irregular maintenance. The intervention therefore highlights a critical lesson: productive assets require continuous technical support if they are to evolve into economically viable livelihood systems.
Social Dimensions	The intervention demonstrates several important social dimensions. First, it successfully targeted groups prioritised under MGNREGA, including: Scheduled Tribe households, small and marginal farmers, women-headed households, and economically vulnerable families. Second, the intervention contributed to improved household nutrition and supplementary income generation while creating opportunities for locally anchored livelihoods. However, it also reveals important social and behavioural challenges. A recurring concern was the declining interest of younger generations in agriculture and allied livelihoods. Migration towards non-farm employment remains a strong trend, limiting the availability of labour and reducing youth participation in pond-based enterprises. There are also behavioural constraints such as: • Dependence on anticipated government support, • Limited entrepreneurial orientation towards fisheries, • and Weak record-keeping practices. At the same time, beneficiaries consistently expressed willingness to improve pond utilisation if training, technical guidance, and mentoring support were made available. This suggests that social constraints may be less about resistance and more about limited access to knowledge and institutional support.
	The ecological dimension is particularly significant because the intervention



Ecological Sustainability Dimensions	converts environmental constraints into productive opportunities. Rather than attempting to eliminate or alter waterlogged conditions, the intervention works with existing ecological realities and transforms them into livelihood assets. Farm ponds typically contribute to water conservation, groundwater recharge, productive utilisation of low-lying lands, and is also a measure for climate adaptation. The integration of fisheries with embankment cultivation further supports diversified land use systems that make more efficient use of available natural resources. Bund plantations involving Assam lemon, banana, arecanut, and other crops contribute to: erosion control, improved land productivity, and diversified agro-ecological systems. The intervention also demonstrates how integrated fishery systems can offer an alternative to more specialised monoculture approaches by generating nutritional, economic, and ecological benefits from relatively small land areas. In this sense, the intervention represents a climate-resilient adaptation strategy that aligns livelihood improvement with natural resource management.
Innovation	The intervention's primary innovation lies not in the farm pond itself, but in treating public assets as entry points for livelihood development. By combining MGNREGA-supported asset creation with fisheries, horticulture, and institutional facilitation, the model demonstrates how existing public investments can generate longer-term livelihood outcomes. Additional innovations include the productive utilisation of waterlogged lands and the integration of multiple livelihood activities around a single household asset.

The above five dimensions interact in mutually reinforcing ways. Institutional convergence enables households to access productive assets. Productive assets create opportunities for technical livelihood activities such as fisheries and horticulture. Technical utilisation generates social benefits through improved nutrition, supplementary income, and livelihood diversification. These livelihood benefits strengthen incentives for maintaining the assets, while ecological improvements enhance long-term resilience.

At the same time, the assessment reveals that weaknesses in any one dimension can constrain overall outcomes. Technical gaps limit productivity. Weak convergence with allied departments restricts livelihood enhancement. Behavioural and knowledge barriers reduce adoption of improved practices.

Scalability and Replicability Potential

The intervention demonstrates significant scalability potential because it is built upon an existing national programme rather than a standalone project structure. By leveraging IBS under MGNREGA, the model uses a financing and implementation mechanism that is already available across rural India.

Its strongest replicable feature lies in the use of an existing national programme to support locally relevant livelihood systems through facilitation and convergence.

Several factors support scalability:

Existing Policy and Funding Framework

The intervention operates through MGNREGA, reducing the need for large external capital investments. The model therefore works within an institutional architecture that already exists and can be adapted in other geographies.

Suitability for Ecologically Constrained Landscapes

The model is particularly relevant for:

- low-lying and waterlogged lands,
- flood-prone areas,
- rain-fed agricultural systems,
- and regions experiencing increasing climate variability.

Rather than treating these ecological conditions as constraints, the intervention demonstrates how they can be converted into productive opportunities.

Community Demand and Demonstration Effect

The expansion from two VDCs in FY 2018–19 to 25 VDCs illustrates strong community demand for productive asset creation when households are able to observe tangible benefits among early adopters.

The visibility of successful farm ponds helps generate local interest and encourages wider participation.

Multi-Purpose Nature of the Asset

Farm ponds support multiple livelihood functions simultaneously, including: fisheries, irrigation, water conservation, horticulture, and household nutrition.

This multifunctionality increases their relevance across different farming systems and household contexts.

Key Insights, Constraints and Limitations

Key Insights	Constraints
Post-Construction Support Determines Long-Term Outcomes One of the most important lessons emerging from the intervention is that infrastructure creation alone is insufficient for livelihood transformation. The productivity and livelihood value of farm ponds depended less on construction itself and more on the availability of technical guidance, institutional convergence, and livelihood handholding after completion. Waterlogged Lands Can Become Productive Assets The intervention challenges conventional perceptions of low-lying and waterlogged lands as agricultural liabilities. Through fisheries, irrigation, and horticulture, these landscapes can become economically productive while simultaneously contributing to water conservation and climate resilience. Convergence Multiplies the Impact of Public Investments The experience demonstrates how MGNREGA can contribute beyond wage employment and asset creation. When supported through facilitation and convergence, public investments can generate longer-term livelihood, nutritional, and resilience benefits. Community Demand Increases When Benefits Are Visible The rapid expansion of the intervention	Many households continue to face technical knowledge gaps that affect productivity and profitability. Weak Post-Construction Ecosystem Support While the intervention has been successful in facilitating asset creation, beneficiaries often lack access to sustained technical guidance and extension support after pond construction. Limited Convergence with Allied Departments There is reportedly insufficient convergence with the govt. line departments. As a result, beneficiaries are often unable to access the full range of support services required to maximise productivity. Infrastructure and Maintenance Challenges Households reported challenges related to: • inadequate fencing, • fish theft, • embankment overflow during monsoon, • seasonal drying, • and irregular maintenance. These issues reduce the efficiency and economic returns of pond-based livelihoods.

suggests that households are willing to adopt productive asset models when they observe tangible benefits among neighbouring beneficiaries. Livelihood Diversification Strengthens Rural Resilience The integration of fisheries, horticulture, irrigation, and agriculture reduces dependence on a single livelihood source and enhances households' ability to manage climatic and economic uncertainties.	Youth Disengagement The continued movement of young people towards non-farm employment creates challenges for the long-term sustainability and expansion of agriculture-linked livelihood systems.
--	---

Conclusion

The experience of KABIL demonstrates that the developmental value of public assets depends not merely on their creation, but on their ability to generate sustained livelihood outcomes. While farm ponds under MGNREGA are often viewed primarily as infrastructure investments, this intervention illustrates how they can evolve into multifunctional livelihood assets that support fisheries, irrigation, horticulture, household nutrition, and climate resilience.

The intervention's most significant contribution lies in its emphasis on facilitation, convergence, and post-construction support. By helping households access public entitlements and encouraging the productive utilisation of farm ponds, KABIL transformed underutilised and waterlogged lands into opportunities for livelihood diversification and rural resilience.

More broadly, the experience highlights an important lesson for rural development programmes: infrastructure alone rarely delivers transformative outcomes. Lasting impact emerges when physical assets are complemented by community mobilisation, institutional coordination, technical support, and market linkages. The KABIL model therefore offers a practical example of how existing public investments can generate greater social, economic, and ecological returns when supported through an integrated livelihood approach.

As rural communities face increasing climatic and economic uncertainties, such approaches offer a promising pathway for strengthening resilience while ensuring that public assets continue to create value long after construction is complete.

From Waste Collection to Waste Governance: Building Community and Institutional Responsibility in the Eco-Sensitive Landscape of Barengabari, Manas National Park



Executive Summary

Barengabari village, located on the fringes of the Manas landscape in Assam, sits at the intersection of conservation, tourism, and rural development. As tourism activity increased and consumption patterns changed, unmanaged waste emerged as a growing challenge across households, tourism establishments, community events, and institutional facilities. However, the core challenge extended beyond waste collection itself. Responsibility for waste management remained fragmented among communities, tourism operators, government agencies, and conservation institutions, with no coordinated mechanism to manage waste across the landscape. Through its Root Connect project, The Midway Journey (TMJ) sought to address this governance gap by developing a convergence-based and community-led waste management model that distributes responsibility across multiple stakeholders rather than relying on a single institution or service provider.

Context and Development Challenge

The Manas landscape represents one of Assam's most ecologically significant regions, where protected forests, tourism enterprises, community settlements, and livelihood activities coexist within a highly sensitive environmental setting. Barengabari village, located near Manas National Park, has witnessed increasing tourism activity over recent years, creating new economic opportunities but also generating new environmental pressures.

Among the most visible of these pressures was the growing challenge of waste management. As tourism expanded and consumption patterns changed, waste generation increased across households, commercial establishments, tourism units, community events, and institutional facilities. However, the systems required to manage this waste did not evolve at the same pace. Source segregation practices were limited, recycling pathways were weak, and waste was frequently disposed of through burning, dumping, or informal arrangements.

Field interactions revealed that the challenge extended beyond village households. Unmanaged waste was also observed around tourism establishments, community events, and institutional facilities, including forest and anti-poaching camps operating within the broader Manas landscape. Despite the ecological sensitivity of the region, waste management responsibilities remained fragmented among communities, tourism operators, local institutions, and government agencies.

The absence of a coordinated system created multiple challenges simultaneously.

From an environmental perspective, unmanaged waste posed risks to village commons, water bodies, and the wider conservation landscape. From a tourism perspective, poor waste management undermined the visitor experience and threatened the environmental image upon which local tourism enterprises depended. From a governance perspective, stakeholders operated in isolation, with no clear mechanism for coordination, accountability, or shared responsibility.

Discussions with tourism operators highlighted the severity of the problem. Several resort owners reported that they had repeatedly approached government institutions seeking sustainable waste disposal solutions but found no reliable mechanism for managing waste generated by tourism establishments. In many cases, operators were compelled to transport waste to facilities outside the immediate area, incurring significant transportation costs and additional financial burdens.

The challenge therefore extended beyond sanitation concerns. It reflected a broader governance failure in which responsibility for waste was dispersed across multiple actors but owned by none.

Key Problem Indicators at Baseline

- Growing waste generation associated with tourism, changing consumption patterns, and commercial activity.
- Limited source segregation at household and institutional levels.
- Waste disposal largely dependent on burning, dumping, or informal arrangements.
- Absence of a coordinated rural waste management system.
- Fragmented responsibility among communities, tourism stakeholders, institutions, and government agencies.
- Lack of structured pathways for recycling and waste recovery.
- Additional financial burdens on tourism operators due to the absence of local disposal mechanisms.
- Limited integration of waste management within conservation and tourism governance systems.

Intervention Design and Approach

Recognising that waste management in eco-sensitive landscapes could not be addressed through collection alone, The Midway Journey designed Root Connect as a convergence-based and community-led waste governance initiative.

Rather than treating waste as a technical problem requiring periodic removal, the intervention sought to address the behavioural, institutional, ecological, and governance dimensions that underpinned the challenge. The central premise was that sustainable waste management would only emerge when responsibility for waste was shared across households, tourism operators, government systems, conservation institutions, and local communities.

Accordingly, the intervention was structured around an integrated waste governance chain comprising:

Awareness → Source Segregation → Collection → Sorting → Storage and Channelisation → Institutional Convergence → Responsible Tourism and Events → Community Ownership

Household-Level Segregation and Behavioural Change

The intervention began by promoting source segregation at the household level through awareness campaigns, demonstrations, community engagement activities, and regular follow-up interactions.

The objective was not simply to improve waste collection efficiency but to establish segregation as a routine household practice and create the behavioural foundation required for downstream recycling and recovery systems.

Approximately 244 households in Barengabari participated in segregation efforts, with source segregation reportedly exceeding 90% in core intervention areas.

Institutional Convergence

A defining feature of the intervention was its emphasis on institutional convergence.

The project deliberately sought to bring together actors who traditionally operated independently of one another, including:

- local communities,
- Forest Department personnel,
- tourism stakeholders,
- Swachh Bharat Mission-Grameen (SBM-G) systems,
- recyclers,
- event organisers,
- and local governance institutions.

Rather than creating a parallel NGO-managed system, Root Connect attempted to align waste management efforts with existing institutional structures and government programmes, thereby strengthening prospects for long-term sustainability.

Conservation and Tourism Integration

The intervention recognised that waste management in Manas could not be separated from tourism and conservation concerns.

Accordingly, waste governance activities were linked with:

- responsible tourism practices,
- Green Leaf Rating processes,
- low-waste community events,
- conservation-linked awareness efforts,
- and waste management systems within forest institutions.

This expanded the intervention beyond sanitation and positioned waste management within a broader ecological stewardship framework.

Building Pathways Towards Circular Systems

In addition to waste collection and segregation, the intervention also explored emerging circular economy initiatives, including vermicomposting, bio-enzyme production, and low-waste tourism systems.

While these initiatives remain at an early stage, they reflect an effort to move beyond conventional waste management towards local circular economy models.

Implementation Mechanism

The implementation process unfolded through a series of interconnected phases, each reinforcing the next to create a gradually strengthening waste governance system.

Phase 1: Building Awareness and Shared Responsibility

The intervention began with community mobilisation and awareness generation around waste management practices. Households were encouraged to view waste not merely as a disposal problem but as a shared community responsibility with implications for public health, tourism, environmental quality, and conservation outcomes.

Behavioural change was recognised as a gradual process. While households generally responded positively to segregation efforts, changing long-established disposal practices required sustained engagement and repeated reinforcement.

To strengthen local participation, volunteers were identified from villages with conscious efforts to maintain gender balance and community representation. These volunteers supported awareness activities, household engagement, and community mobilisation efforts. Parallel efforts were also undertaken to challenge and destigmatise prevailing social taboos associated with waste work, fostering greater dignity and recognition for those engaged in waste management activities.

Phase 2: Establishing Segregation, Collection and Sorting Systems

Once segregation practices were introduced, the intervention focused on creating operational systems capable of handling segregated waste.

Waste collection systems were established for both households and commercial establishments, with collections conducted on a weekly basis. Waste generated by households, tourism establishments, and community activities is collected, transported, sorted, and channelised through an organised process.

Dry waste is transported to the Swachh Bharat Mission Plastic Waste Management Unit in

Gobardhana Block, where it is sorted and weighed by a team comprising one male and one female waste management worker supported through the project.

The facility functions as an intermediate sorting and channelisation point before recyclable materials are transferred to multiple waste processors located at Barpeta Road for further processing.

Approximately 1500 kg of waste is reportedly collected and channelised every month, with waste quantities increasing as household participation expands.

Phase 3: Institutional Engagement and Convergence

As implementation progressed, the project expanded beyond household systems to engage institutional stakeholders. Field observations revealed that unmanaged waste was not confined to villages and tourism establishments but was also present within forest and anti-poaching camps operating inside the Manas landscape.

In response, segregation systems were introduced across all five ranges of Manas National Park with the support of Dr C Ramesh, Field Director of Manas Tiger Reserve and National Park. Sacks were distributed to forest camps, more than 100 Forest Department personnel were oriented on waste management practices, and waste collection systems were initiated within forest and anti-poaching camps.

Simultaneously, the intervention strengthened coordination with SBM-G systems, local institutions, recyclers, and tourism stakeholders, creating a network of actors contributing to waste governance across the landscape.

Phase 4: Responsible Tourism and Low-Waste Events

Recognising tourism as both a contributor to and potential solution for waste generation, the intervention actively engaged tourism establishments operating in and around the Manas landscape.

Approximately 20 tourism units participated in the initiative, receiving support on waste segregation practices, responsible waste management, and environmental standards. Seventeen tourism establishments subsequently received Green Leaf Ratings in recognition of their efforts to adopt environmentally responsible practices.

The project also extended its activities to community events such as Manas Festival and Karam Festival, promoting low-waste systems, waste recovery efforts, and alternatives to single-use materials.

Through these efforts, waste management was positioned not only as a sanitation issue but as an integral component of responsible tourism and conservation-sensitive development.

Outcomes and Observable Changes

Improved Household Waste Segregation

One of the most visible outcomes of the intervention has been the adoption of source segregation practices at the household level. Through sustained awareness efforts and regular engagement, segregation has become a routine practice among a significant proportion of participating households in Barengabari.

The project reports that more than 90% source segregation has been achieved in core intervention areas, with 244 households actively participating in segregation efforts. While behavioural change remains an ongoing process, the intervention has succeeded in moving waste segregation from an occasional activity to a more regular household practice.

Emergence of Responsible Tourism Practices

Field interactions with tourism stakeholders highlighted the practical significance of the intervention. Several resort operators reported that prior to the intervention they had repeatedly approached local authorities seeking a sustainable waste disposal mechanism but found no reliable system. In the absence of local solutions, many were compelled to transport waste to facilities outside the immediate area, increasing operational costs and logistical burdens. Stakeholders noted that the organised collection and channelisation system established through Root Connect helped address a longstanding gap in local waste management while also contributing to cleaner surroundings and more responsible tourism practices.



Figure 18 Waste collection from Forest camp inside Manas National Park

Establishment of Regular Waste Management Systems

Prior to the intervention, waste management was largely dependent on informal disposal methods such as burning, dumping, or ad hoc arrangements. The intervention established a structured system connecting segregation, collection, sorting, storage, and recycling channelisation. Weekly collection systems are now operational for both households and commercial establishments. Waste collected from participating stakeholders is sorted and processed through the Plastic Waste Management Unit at Gobardhana Block before being channelised for recycling. The intervention has therefore created a functioning waste management pathway where none previously existed.



Figure 19 Community members sorting waste in Plastic Waste Management Unit of Gobardhana Block

Institutionalisation of Waste Management Within Conservation Systems

A notable outcome has been the integration of waste management practices within forest and anti-poaching camps across the Manas landscape.

More than 100 Forest Department personnel have reportedly been oriented on waste management practices, while segregation and collection systems have been introduced across all five forest ranges of Manas National Park.

This represents an important shift because institutional waste systems within protected-area landscapes are often overlooked in conventional rural waste management programmes.



Figure 20 Workshop on Community Based Tourism in Barengabari

Strengthened Stakeholder Coordination

The intervention has created working relationships among a diverse set of stakeholders, including: households, community volunteers, tourism operators, Forest Department personnel, SBM-G systems, recyclers, and local implementation teams.

While these relationships continue to evolve, the intervention has demonstrated that waste management responsibilities can be distributed across multiple actors rather than concentrated within a single institution.

Emerging Circular Economy Initiatives

The intervention has also initiated exploratory activities linked to circular resource systems, including vermicomposting, bio-enzyme production, and low-waste tourism practices.

Although these initiatives remain at an early stage and cannot yet be considered mature outcomes, they indicate a gradual shift from waste disposal towards resource recovery and circular economy thinking.



Figure 21 Material channelising process

Assessment Across Analytical Dimensions

Following the framework's conceptual structure, the Barengabari intervention is assessed across five analytical dimensions and their interactions.

Institutional Dimensions	The intervention's strongest contribution lies in its governance architecture. By bringing together households, tourism operators, Forest Department personnel, SBM-G systems, recyclers, community volunteers, and local institutions, Root Connect created a shared framework of responsibility for waste management. The model is particularly significant because it creates operational coordination between sectors that typically function independently of one another. Particularly significant is the inclusion of forest and anti-poaching camps, extending accountability beyond village boundaries and strengthening institutional ownership across the wider Manas landscape. However, the governance system remains in an evolving stage. Village waste committees are still being formed, and the intervention continues to depend substantially on facilitation by The Midway Journey. Community ownership therefore remains a work in progress rather than a fully realised outcome.
	The technical model is based on simple but functional systems for segregation, collection, sorting, channelisation, and recycling. Its

Technical Dimensions	strength lies not in technological sophistication but in establishing an operational waste management chain where none previously existed. The integration of waste-flow tracking, recovery monitoring, and monthly performance reviews further strengthens accountability and evidence-based management.
Social Dimensions	The intervention is fundamentally a behaviour-change initiative. The reported adoption of source segregation by participating households reflects a shift from individual disposal practices towards collective responsibility for waste management. Deliberate efforts to ensure gender-balanced participation, representation from different communities, and recognition of waste workers further strengthened social legitimacy and community ownership.
Ecological Sustainability Dimensions	The intervention is particularly relevant because of its location within the Manas landscape. By reducing the risk of waste leakage into forests, tourism sites, water bodies, and community spaces, it contributes to conservation-sensitive development. The integration of households, tourism establishments, forest camps, and community events within a common waste management system extends ecological responsibility across the landscape. The promotion of low-waste events, alternatives to single-use materials, and emerging circular economy activities strengthens this ecological orientation. At the same time, ecological outcomes remain difficult to quantify. Ecological contributions can be understood primarily through the intervention's preventive and stewardship-oriented approach rather than through measured environmental outcomes
Innovation	The primary innovation lies in reframing waste management as a governance challenge rather than a collection challenge. Instead of focusing solely on waste removal, the model distributes responsibility across communities, tourism stakeholders, conservation institutions, recyclers, and government systems. Equally innovative is the integration of waste management with responsible tourism and conservation objectives, creating a governance model tailored to eco-sensitive landscapes.

The five dimensions reinforce one another in mutually reinforcing ways. Institutional convergence creates the enabling environment for technical waste management systems to function. Technical systems generate visible improvements that encourage behavioural adoption and strengthen confidence in the intervention. Behavioural adoption, in turn, builds social ownership and participation among households, volunteers, tourism stakeholders, and institutions. Increased social ownership reinforces ecological stewardship by reducing waste leakage into forests, tourism sites,

water bodies, and community spaces. Together, these dynamics create a governance-based model of waste management rather than a service-delivery model.

Scalability and Replicability Potential

The Barengabari model demonstrates significant potential for replication in rural tourism destinations, conservation landscapes, and eco-sensitive regions where waste management challenges are characterised by fragmented institutional responsibility rather than the absence of infrastructure alone.

Its strongest replicable feature is the governance architecture rather than any specific technical component. Source segregation, collection systems, and waste channelisation mechanisms are already widely understood within the waste management sector. What distinguishes the intervention is its ability to bring together multiple actors with differing responsibilities and incentives into a shared waste governance framework.

Conditions Required for Replication

Successful replication would require:

- sustained community mobilisation,
- institutional cooperation among multiple stakeholders,
- access to sorting and recycling pathways,
- facilitation capacity during the initial years,
- and a local organisation capable of coordinating convergence processes.

Factors Supporting Scalability

Institutional Convergence Model

The intervention demonstrates how communities, tourism operators, Forest Department institutions, local governance systems, SBM-G structures, recyclers, and volunteers can operate within a coordinated framework. This convergence-based approach is relevant across many protected-area landscapes where institutional fragmentation remains a major challenge.

Low Technology Dependence

The model does not rely on sophisticated infrastructure or capital-intensive technologies. Its core components: segregation, collection, sorting, awareness generation, and channelisation, can be adapted in a wide variety of rural contexts.

Compatibility with Existing Government Systems

By aligning with existing SBM-G systems and conservation institutions rather than creating parallel structures, the intervention offers a pathway for integration within existing public programmes.

Applicability to Tourism Landscapes

The engagement of tourism operators through awareness, segregation systems, and

environmental standards makes the model particularly relevant for rural destinations experiencing increasing tourism pressure.

Behavioural Change Framework

The emphasis on awareness, local participation, and gradual behaviour change is adaptable across diverse socio-cultural settings and does not depend on a specific technology or infrastructure platform.

7. Key Insights and Constraints

What Worked	Constraints
Convergence Creates Accountability The intervention demonstrates that waste management systems become more effective when responsibility is shared across communities, institutions, tourism stakeholders, recyclers, and government agencies. Convergence created both operational coordination and a stronger sense of accountability among stakeholders. Behaviour Change Is the Foundation of Waste Management Infrastructure and collection systems can only function effectively when households adopt segregation and responsible disposal practices. The experience of Barengabari highlights the importance of sustained awareness, community engagement, and behavioural change as prerequisites for long-term waste management outcomes. Conservation and Waste Governance Are Interconnected In eco-sensitive landscapes, waste management cannot be treated solely as a sanitation issue. The intervention demonstrates how waste governance contributes to environmental stewardship, tourism quality, and conservation objectives simultaneously. Inclusion Strengthens Local Ownership The conscious inclusion of women, community volunteers, and diverse social	Financial Sustainability Remains Unresolved One of the most significant challenges is the long-term financial viability of rural waste management systems. Low waste volumes and distant recycling markets increase operational costs and reduce revenue potential from recyclables. Most importantly, the model currently remains dependent on facilitation support. Replication at scale would therefore require mechanisms to institutionalise responsibilities and reduce dependence on external actors over time.

groups strengthened local legitimacy and participation. Waste governance systems are more likely to be sustained when communities view them as collective rather than externally imposed initiatives.

Governance Matters More Than Technology

The experience suggests that the success of rural waste management systems depends less on sophisticated infrastructure and more on the ability to organise institutions, communities, and incentives around a shared framework of responsibility.

How convergence with other CSOs can help/support in bridging the gaps

The Root Connect seeks support to convert their current field-level experience into a more structured and replicable model for eco-sensitive rural and tourism landscapes. This may include support in documenting the model, strengthening monitoring systems, building a long-term revenue and financial sustainability plan, developing community institutions, and creating pathways for scaling the approach in other protected-area and rural tourism regions. They also hope to institutionalise the model by connecting it with policy platforms, funders, government departments and other organisations working on rural livelihoods, climate resilience, tourism and local governance.

Government agencies can support by ensuring that existing SBM-G assets, infrastructure and operational funds are made regularly available for collection, storage, sorting, processing and channelisation. Departments such as Forest, Tourism, Panchayat/VCDC institutions and SBM-G can also help make source segregation, low-waste events, responsible tourism practices and forest camp waste management part of regular governance systems. Other CSOs with expertise in building local committees, community-owned enterprises and financial models can support Root Connect in strengthening local ownership and long-term sustainability. CSOs interested in waste management can also undertake immersion visits in Barengabari to understand the model and adapt similar practices in their own geographies.

Conclusion

The central contribution of the Barengabari intervention lies not in demonstrating that waste can be collected, but in showing that responsibility for waste can be shared. By bringing together communities, tourism stakeholders, conservation institutions, recyclers, and government systems within a common framework, the intervention created the foundations for a more coordinated and accountable approach to waste management.

More broadly, the experience highlights an important lesson for eco-sensitive landscapes: sustainable waste management depends less on infrastructure alone and more on the ability to align behaviour, institutions, and environmental stewardship around shared responsibilities. In this sense, Root Connect offers a promising example of how rural waste management can evolve from a sanitation service into a broader system of environmental governance capable of supporting conservation, tourism, and community well-being simultaneously.



Building Community Institutions for Conservation and Rural Resilience in the Nameri Landscape



Executive Summary

Communities living around the Nameri landscape have long navigated the challenges of coexisting with wildlife while simultaneously facing limited livelihood opportunities, youth migration, declining traditional weaving practices, and the gradual erosion of Indigenous knowledge systems. While Human-Elephant Conflict (HEC) was one of the most visible challenges, the underlying issue was the absence of strong community institutions capable of helping people collectively manage risks, access opportunities, and engage with conservation and development processes.

Since 2017, WWF-India, through its local partner Manas and Nameri Conservation Foundation (MASK), has worked across 48 villages along the western boundary of the Nameri landscape to strengthen community-led institutions that support conservation, livelihoods, local leadership, and cultural resilience. The intervention combined community-based elephant monitoring, compensation facilitation, women-led enterprise development, producer-owned institutions, and Indigenous knowledge documentation within a single institution-building framework.

Today, a community elephant monitoring network of more than 25 volunteers supports local preparedness and coordination, while the Airawat community-based compensation initiative assists approximately 70 households in a critical elephant corridor. Women's collectives have evolved into Weavers Nest and subsequently Nobomilan Agro Producer Company Limited (NAPCL), which now connects more than 518 shareholders across the Eri silk value chain, with only 22 male shareholders. The intervention has also strengthened the documentation and transmission of Indigenous Ecological Knowledge and Indigenous Technical Knowledge across communities.

The experience demonstrates that durable community institutions can serve as the foundation for both conservation and rural development. Rather than addressing wildlife conflict, livelihoods, leadership, and cultural preservation as separate issues, the intervention illustrates how long-term investment in community institutions can strengthen local capacities to address multiple challenges simultaneously while shaping more resilient and self-determined development pathways.

Context and Development Challenge

The villages located along the western boundary of the Nameri landscape occupy a unique position at the interface of human settlements, forests, and wildlife habitats. Communities have historically lived alongside elephants, gaur, wild pigs, and other wildlife species, creating a landscape where conservation and everyday rural life are closely intertwined. Across the region's 48 villages, interactions with wildlife are not occasional events but recurring realities that directly influence livelihoods, food security, and well-being.

Among the most visible challenges was HEC. Crop damage, property loss, and sleepless nights spent guarding agricultural fields were recurring experiences for many households. Responses to elephant movement were often reactive, with villagers mobilising when conflict occurred but possessing limited mechanisms for collective monitoring, preparedness, or coordinated response. Affected families also faced difficulties in accessing compensation for wildlife-related losses. Navigating documentation requirements, claim procedures, and communication with government agencies was often complex and time-consuming. As a result, many households struggled to access available support systems despite experiencing recurring losses.

Beyond wildlife conflict, communities faced broader development challenges. Livelihood opportunities remained limited, contributing to economic vulnerability and youth migration. Traditional weaving practices, once an important source of income and cultural identity, faced declining viability due to weak market access and limited opportunities for enterprise development. At the same time, valuable Indigenous Ecological Knowledge and Indigenous Technical Knowledge relating to forests, wildlife behaviour, traditional foods, medicinal plants, agriculture, and weaving traditions remained largely undocumented and increasingly vulnerable to erosion across generations.

The challenge therefore extended beyond conservation or livelihoods alone. It involved strengthening the institutions, leadership, and collective capacities through which communities could manage conflict, access opportunities, preserve cultural knowledge, and engage more effectively with conservation and development processes. The central question was not simply how to reduce human-elephant conflict, but how to build resilient community institutions capable of supporting coexistence, livelihoods, and local development over the long term.

Key Challenges at Baseline

- Recurring human-elephant conflict and crop damage.
- Limited mechanisms for collective monitoring and response.
- Difficulties in accessing and navigating compensation processes.
- Weak institutional structures for community coordination.
- Limited livelihood opportunities and youth migration.
- Declining viability of traditional weaving practices.
- Weak market access for local producers.
- Erosion of Indigenous Ecological Knowledge and Indigenous Technical Knowledge.
- Limited community engagement with government systems and external institutions.

2. Intervention Design and Approach

WWF-India, through its local partner MASK, approached the challenge from the perspective that long-term conservation outcomes depend on the strength of local communities and institutions. While HEC, livelihood insecurity, declining traditional skills, and the erosion of Indigenous

knowledge appeared as distinct challenges, they shared a common underlying constraint: limited collective mechanisms through which communities could organise, respond, and engage with change.

Rather than addressing these issues through isolated projects, the intervention adopted an institution-building approach designed to strengthen community capacities for collective action, leadership, problem-solving, and engagement with external systems. The objective was not only to reduce conflict or improve livelihoods, but to create locally owned institutions capable of supporting conservation and development outcomes over the long term.

The approach was built around four interrelated pillars:

Community-Based Conservation and Coexistence

The intervention sought to strengthen local capacities for responding to human-elephant conflict through community-led monitoring systems, volunteer networks, and compensation facilitation mechanisms. The emphasis was placed on preparedness, coordination, and coexistence rather than reactive responses to conflict incidents.

Community Leadership and Local Ownership

Recognising that durable change depends on local leadership, the intervention invested in volunteers, women's groups, youth groups, farmers, weavers, and traditional leaders. The objective was to strengthen community ownership and create institutions capable of functioning beyond individual projects and funding cycles.

Livelihood Development Through Collective Enterprise

The intervention supported women-led collective enterprise development through skill enhancement, market engagement, exposure visits, and producer-owned institutional structures linked to the Eri silk value chain. The approach sought to strengthen both livelihood security and women's economic leadership.

Indigenous Knowledge and Community Learning

The intervention recognised Indigenous Ecological Knowledge and Indigenous Technical Knowledge as valuable community assets. Efforts were therefore undertaken to document, preserve, and promote local knowledge relating to forests, wildlife behaviour, agriculture, traditional foods, medicinal plants, and weaving practices, while strengthening opportunities for intergenerational learning.

Together, these pillars created a framework through which communities could simultaneously strengthen conservation outcomes, livelihood opportunities, local leadership, and cultural resilience. Rather than addressing individual challenges in isolation, the intervention sought to build institutions capable of responding to multiple challenges and opportunities over time.

3. Implementation Mechanism

The intervention was implemented through a long-term process of community mobilisation, institution-building, leadership development, and livelihood strengthening. Rather than creating separate structures for individual projects, MASK focused on nurturing community institutions capable of addressing multiple conservation and development challenges over time. The implementation process evolved through five interconnected phases.

Phase 1: Community Mobilisation and Leadership Development

The intervention began with sustained engagement with community volunteers, women's groups, youth groups, farmers, weavers, and traditional leaders across villages in the Nameri landscape. Rather than positioning communities as beneficiaries of externally designed programmes, MASK focused on identifying and strengthening local leadership capable of driving collective action from within communities.

Regular interactions, discussions, exposure visits, and community meetings created opportunities for residents to collectively reflect on conservation challenges, livelihood opportunities, and local development priorities. Over time, these engagements helped build trust, strengthen local ownership, and lay the foundation for durable community institutions.

Phase 2: Community-Based Conservation and Coexistence Systems

Building upon this foundation, the intervention supported the establishment of community-led systems for wildlife coexistence. A community elephant monitoring network comprising more than 25 volunteers was formed to monitor elephant movement, share alerts, support affected households, and coordinate with frontline forest staff.

The intervention also strengthened communities' ability to access compensation systems through the Airawat community-based compensation initiative. Covering approximately 70 households within a critical 5 km elephant corridor, Airawat supported affected families in documenting losses, understanding claim procedures, and engaging with relevant authorities. Rather than replacing formal compensation mechanisms, the initiative strengthened communities' ability to navigate them effectively.

Together, these systems strengthened preparedness, coordination, and community participation in responding to HEC.

Phase 3: Strengthening Women's Collectives and Livelihood Institutions

Recognising the importance of livelihood security in supporting long-term conservation outcomes, MASK invested in strengthening women's collectives and traditional weaving practices. Women participated in skill enhancement programmes, exposure visits, design development initiatives, and collective production activities linked to the Eri silk value chain.

A significant milestone was the establishment of Weavers Nest, which created a platform for collective learning, enterprise development, product innovation, and market engagement. Beyond income generation, the platform strengthened women's leadership, confidence, and participation in community institutions.

Phase 4: Building Producer-Owned Economic Institutions

As community institutions matured, collective enterprise activities gradually evolved into more formal economic structures. This process culminated in the establishment NAPCL, a producer-owned institution connecting women engaged across multiple stages of the Eri silk value chain, including food plant cultivation, cocoon production, spinning, weaving, natural dyeing, and product development.

The significance of NAPCL lies not only in its economic function but also in the institutional pathway through which it emerged. Rather than being created as a standalone enterprise, it evolved from years of community mobilisation, collective action, leadership development, and trust-building.

Phase 5: Knowledge Systems and Emerging Livelihood Pathways

The intervention also invested in documenting and promoting Indigenous Ecological Knowledge (IEK) and Indigenous Technical Knowledge (ITK) relating to wildlife behaviour, forests, traditional foods, agriculture, medicinal plants, and weaving practices. This helped strengthen intergenerational learning while reinforcing the connections between culture, livelihoods, and conservation.

As community institutions strengthened, new livelihood opportunities also began to emerge.

Alongside weaving and Eri silk enterprises, some community members started exploring homestay-based tourism and other nature-linked enterprises rooted in local culture and the surrounding landscape. While still emerging, these initiatives reflect growing community confidence in engaging with new opportunities built upon local assets and identity.

Outcomes and Observable Changes

Emergence of Durable Community Institutions

The most significant outcome of the intervention has been the emergence of community institutions that continue functioning beyond individual project cycles. Community volunteers, elephant monitoring groups, women's collectives, producer institutions, and local leadership platforms have remained active over time, demonstrating a high degree of local ownership and institutional continuity.

Unlike many project-based initiatives that conclude when external support ends, these institutions continue to provide platforms for collective action, coordination, learning, and community engagement. Their continued functioning represents a strong indicator of long-term sustainability.

Strengthened Community Capacity for Human-Elephant Coexistence

The establishment of community-based monitoring systems has strengthened local preparedness and coordination in responding to HEC. A network of more than 25 community volunteers now supports the monitoring of elephant movement, information sharing between villages, coordination with frontline forest staff, and assistance to affected households.

While HEC remains a recurring reality within the landscape, communities now possess stronger collective mechanisms through which to anticipate, communicate, and respond to conflict situations. This represents a shift from largely reactive responses towards more organised community-led coexistence systems.

Improved Access to Compensation and Support Systems

The Airawat community-based compensation initiative has strengthened communities' ability to access existing compensation mechanisms following wildlife-related losses. Covering approximately 70 households located within a critical five-kilometre elephant corridor, the initiative has reduced procedural barriers by supporting affected families with documentation, communication, and claim-related processes.

Beyond compensation itself, the initiative has contributed to stronger engagement between communities and relevant government agencies, helping improve trust, communication, and institutional linkages.

Transformation of Women's Collectives into Producer-Owned Institutions

One of the most notable outcomes has been the evolution of women's collectives into structured economic institutions. What began as community-based weaving groups gradually evolved into Weavers Nest and subsequently NAPCL.

Today, NAPCL connects more than 518 shareholders across the Eri silk value chain of whom only 22 are men. This reflects not only livelihood enhancement but also substantial progress in women's economic participation, leadership, and ownership within community institutions.

Preservation and Recognition of Indigenous Knowledge Systems

The documentation and promotion of IEK and ITK have contributed to preserving valuable community knowledge relating to wildlife behaviour, forests, traditional foods, medicinal plants, agriculture, and weaving practices.

The intervention has strengthened recognition of local knowledge systems as assets that contribute to conservation, livelihoods, cultural identity, and community resilience. It has also created opportunities for intergenerational learning and knowledge transmission that may help reduce the

risk of knowledge erosion over time.

Strengthened Community Agency and Emerging Livelihood Opportunities

The intervention has contributed to the emergence of local leaders capable of engaging with government departments, conservation agencies, markets, and external organisations. Communities increasingly participate in decision-making processes, facilitate collective activities, and pursue development opportunities through their own institutions.

Alongside strengthening existing livelihoods, communities have also begun exploring new opportunities such as homestay-based tourism and nature-linked enterprises rooted in local culture and the surrounding landscape. While still emerging, these initiatives reflect growing confidence in community-led enterprise development and local economic diversification.

Strengthened Conservation-Development Linkages

Perhaps the most important outcome is the strengthening of relationships between conservation and development. Rather than treating wildlife coexistence, livelihoods, cultural preservation, and local governance as separate priorities, the intervention has demonstrated how community institutions can support multiple objectives simultaneously.

This integrated approach has helped create a stronger foundation for both conservation outcomes and community well-being, illustrating the value of institution-centred approaches within conservation landscapes.

Assessment Across Analytical Dimensions

Institutional Dimensions	The intervention's strongest contribution lies in its ability to build durable community institutions capable of addressing multiple challenges simultaneously. Rather than creating project-specific structures, MASK invested in volunteer networks, elephant monitoring groups, women's collectives, producer-owned institutions, and knowledge platforms that continue functioning beyond individual project cycles. The progression from community groups to Weavers Nest and subsequently NAPCL demonstrates how community institutions can gradually evolve into more formal and self-sustaining structures. More importantly, the intervention illustrates how communities can transition from beneficiaries of conservation programmes to active actors in local governance and development.
Technical Dimensions	The technical strength of the intervention lies in the creation of functional systems that translate local knowledge and collective action into organised responses. Community-based elephant monitoring, compensation facilitation through Airawat, producer-owned enterprise structures, and Indigenous knowledge documentation all represent practical systems designed around local realities. These systems enable communities to coordinate action, access services, engage with institutions, and manage challenges more effectively over time.



Social Dimension	The intervention has strengthened collective action, local leadership, and community agency across participating villages. Women's participation through weaving collectives and NAPCL expanded opportunities for economic engagement and leadership, while volunteer networks strengthened social cohesion and shared responsibility. The recognition and promotion of IEK and ITK further reinforced cultural identity, community pride, and intergenerational learning. Together, these outcomes have contributed to stronger social capital and community resilience.
Innovation	The primary innovation lies in the intervention's institution-centred approach to conservation and development. While many programmes address conflict mitigation, livelihoods, enterprise development, or knowledge preservation separately, the MASK model treats them as interconnected outcomes of strong community institutions. The intervention demonstrates how volunteer networks can evolve into governance platforms, women's collectives into producer-owned enterprises, and local knowledge into community assets that support both conservation and development objectives.
Ecological Sustainability Dimension	The intervention contributes to ecological sustainability by strengthening local capacities for coexistence with wildlife and reinforcing the role of communities as stewards of the landscape. Community-based monitoring systems improve preparedness and coordination in responding to HEC, while IEK supports local understanding of wildlife behaviour, natural resources, and ecosystem dynamics. By strengthening community engagement with conservation processes, the intervention promotes stewardship-based conservation rather than approaches that depend solely on external enforcement.

The intervention's outcomes emerge from the interaction of institutions, functional systems, social capital, innovation, and ecological stewardship. Strong community institutions enable monitoring systems, compensation processes, enterprise development, and knowledge preservation initiatives to function effectively. These systems strengthen local leadership and participation, which in turn reinforce conservation engagement and ecological stewardship. Together, these interactions demonstrate that conservation, livelihoods, cultural resilience, and community development are mutually reinforcing when anchored in strong local institutions.

6. Scalability and Replicability Potential

The MASK experience demonstrates strong potential for replication in landscapes where conservation challenges intersect with livelihood insecurity, weak community institutions, and limited local leadership. While the intervention emerged within the context of the Nameri landscape and human-elephant conflict, its core lessons extend well beyond wildlife conservation. The model's strength lies not in any single activity, but in its ability to build durable community

institutions capable of addressing multiple challenges simultaneously. Community monitoring systems, women's collectives, producer institutions, Indigenous knowledge platforms, and local leadership structures emerged through a common process of long-term mobilisation, trust-building, and collective action.

Several characteristics enhance the model's scalability and replicability:

Community-Led Institutional Development:

The model is based on strengthening local institutions rather than creating externally dependent systems. This makes it adaptable to different social, ecological, and economic contexts.

Use of Existing Community Structures

Many components of the intervention build upon existing community groups, volunteers, women's collectives, and traditional leadership systems, reducing the need for extensive new institutional arrangements.

Flexible Livelihood Pathways:

Although the intervention in Nameri focused significantly on the Eri silk value chain, the broader approach can be adapted to other livelihood systems based on local resources, skills, and market opportunities.

Alignment with Conservation and Development Priorities:

The model addresses objectives that are relevant across many conservation landscapes, including livelihood enhancement, community participation, conflict mitigation, women's empowerment, and knowledge preservation.

Conditions Required for Replication

Successful replication requires sustained community engagement, long-term facilitation, and investment in local leadership development. Building effective institutions is a gradual process that depends on trust, participation, and community ownership.

Replication also requires sensitivity to local contexts. Livelihood opportunities, conservation challenges, cultural practices, and institutional arrangements vary across landscapes and should inform programme design. While the overall approach is transferable, specific activities and institutional structures should be adapted to local realities.

The Nameri experience suggests that institution-building approaches can provide a durable foundation for addressing multiple conservation and development challenges simultaneously. Rather than replicating individual activities, the greatest opportunity lies in adapting the underlying principles of community ownership, collective action, and long-term capacity development

Key Insights, Constraints and Limitations

Key Insights	Constraints
Durable Change Emerges Through Institutions The most important lesson from the intervention is that sustainable change is often rooted in institutions rather than activities. Community monitoring groups, volunteer networks, women's collectives, and producer institutions have continued	Sustaining Volunteer Motivation Many intervention components depend heavily on community volunteers and local leaders. Sustaining motivation, participation, and leadership over long periods without formal incentives can be

functioning beyond individual projects because they were built through local ownership and collective participation.

Conservation and Livelihoods Are Interdependent

The experience demonstrates that conservation outcomes are strengthened when communities possess secure livelihoods, functioning institutions, and opportunities for local development. Wildlife coexistence becomes more achievable when communities have mechanisms through which they can collectively address challenges and pursue opportunities.

Women's Collectives Can Evolve into Economic Institutions

The transition from weaving groups to Weavers Nest and eventually Nobomilan Agro Producer Company Limited illustrates how community mobilisation can create pathways towards more formal and economically significant institutions. This progression highlights the transformative potential of long-term engagement with women's collectives.

Local Leadership Creates Long-Term Resilience

The intervention underscores the importance of nurturing local leadership rather than relying exclusively on external actors. Communities become more resilient when local leaders can mobilise collective action, facilitate communication, and engage with institutions beyond the village level.

Indigenous Knowledge Is a Development Asset

The documentation and promotion of Indigenous Ecological Knowledge and Indigenous Technical Knowledge demonstrates that local knowledge systems can contribute meaningfully to conservation, livelihoods, cultural preservation, and community learning. Such knowledge should be recognised as an asset rather than merely as cultural heritage.

challenging and requires continued community ownership and recognition.

Market Development Remains an Ongoing Need

Although producer institutions and weaving collectives have strengthened economic opportunities, continued efforts will be required to expand market access, strengthen product visibility, and improve value realisation for producers.

Balancing Multiple Objectives

The intervention simultaneously addresses conservation, livelihoods, institution-building, knowledge preservation, and leadership development. Maintaining focus and coordination across these interconnected objectives can be challenging and requires adaptive management.

Generational Transition

While significant efforts have been made to preserve Indigenous knowledge and strengthen local leadership, ensuring that younger generations continue to engage with these systems remains an ongoing challenge.

How convergence with other CSOs can help/support in bridging the gaps

The MASK experience demonstrates that institution-building can create a durable foundation for both conservation and rural development. However, sustaining and expanding these gains requires

continued support from government agencies, civil society organisations, and development partners.

TRI can play an important role in documenting, disseminating, and promoting institution-centred approaches to conservation and community development. Facilitating peer learning between organisations working in conservation landscapes can help strengthen understanding of how community institutions contribute to long-term resilience and sustainability.

Government agencies can support the continued strengthening of community institutions by recognising and engaging local volunteer networks, producer institutions, and community leaders as important partners in conservation and development. Greater support for community-led conflict mitigation, livelihood diversification, producer collectives, and Indigenous knowledge initiatives can further strengthen local capacities.

There is also scope to support the growth of women-led economic institutions such as Nobomilan through market linkage programmes, enterprise development support, design innovation, branding, and access to wider markets. Strengthening these economic opportunities can enhance both livelihood security and institutional sustainability.

Other CSOs can contribute by supporting leadership development, facilitating community learning exchanges, strengthening producer institutions, documenting Indigenous knowledge systems, and promoting youth engagement in conservation and livelihood initiatives. Particular attention may be given to ensuring that institutional gains are sustained across generations.

Finally, there is a need for stronger documentation and evidence generation on community-led conservation models. Continued learning, monitoring, and research can help inform policy discussions and support replication in other conservation landscapes.

Conclusion

The experience of WWF-India and MASK in the Nameri landscape demonstrates that conservation and rural development become more sustainable when communities possess the institutions, leadership, and collective capacity to shape their own futures. While the intervention engaged with diverse themes, including human-elephant coexistence, women's livelihoods, Indigenous knowledge, and enterprise development. Its most enduring contribution lies in strengthening the community institutions that connect these objectives.

Over time, community volunteers evolved into monitoring networks, women's collectives matured into producer-owned enterprises, and Indigenous knowledge systems became recognised as valuable community assets. These developments strengthened not only livelihoods and local leadership, but also communities' ability to engage with conservation processes, government systems, and emerging economic opportunities.

More broadly, the experience highlights an important lesson for conservation landscapes: durable outcomes emerge not simply from projects or activities, but from the institutions that enable communities to organise, learn, adapt, and act collectively. When communities are supported to build and sustain such institutions, conservation, livelihoods, cultural resilience, and local development cease to be competing priorities and instead become mutually reinforcing pathways towards long-term resilience.

In this sense, the Nameri experience offers a compelling example of how community institutions can serve as the foundation for both conservation and community well-being in complex rural landscapes.

