Roundtable for

Co-designing Beckn-enabled Open Network for Carbon Markets (ONCM)

Outcome Paper

25th March 2026

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NFH NETWORKS FOR HUMANITY

Table of Contents

Contents

1. Background and Purpose of the Roundtable

On March 19th , 2026, Indian Institute of Management Bangalore (IIMB) held a roundtable on 'Open Network for Carbon Markets'. IIMB's Center for Digital Public Goods (IIMB CDPG) convened the event to bring prominent stakeholders from the Carbon Market ecosystem to discuss how an open, protocol-enabled network could support high-integrity, scalable carbon markets that are consistent with India's evolving regulatory context. The roundtable intended to move beyond fragmented, platform-centric approaches by investigating an interoperable "open network" architecture capable of interconnecting registries, MRV/ dMRV systems, project developers, buyers, investors, and regulators. Its principal objective was to examine and strengthen the ONCM design principles, governance blueprints, and pilot pathways through structured debates in focused working groups, which would inform both policy design and technical implementation. The purpose of convening this dialogue was to ensure that India's next-generation carbon market infrastructure is co-designed with practitioners, proactively considers on-the-ground constraints and opportunities, and can unlock climate finance for smallholders, communities, and high-quality mitigation projects at scale.

2. Participation at ONCM Roundtable

Participants at the roundtable represented a broad spectrum of the carbon market and digital public infrastructure ecosystems. Roundtable noted the participation of leaders from Networks for Humanity (Formerly know Foundation for Interoperability in Digital economy-FIDE.org: genesis author of Beckn Protocol), Finternet (Part of Networks for Humanity-NFH), Multi Commodity Exchange (MCX), Indian Institute of Forest Management Bhopal (IIFM), ISRO's National Remote Sensing Centre (NRSC), Indian Institute of Management Bangalore (IIMB), National Law School of India University Bangalore (NLSIU), Indian Institute of Technology Madras (IITM) as well as organizations like Reliance Industries Ltd., SML Ltd., Tata Trusts, Tata Consultancy Services, RenewCred, PhonePe, iSPIRT, YUVA Unstoppable, Health Care Without Harm, ARTECH International C Beyond Bar Code and Tata Motors. Participants from TCS's (Sweden Office), ARTECH International C Beyond Bar Code (Brussels, Belgium, EU) connected virtually from EU bringing in the perspective from European Union's side about cross-border carbon credit trading, CBAM and Digital Product Passport (DPP). For a detailed list of roundtable participants and their respective organizations, see Table in Appendix 1.

3. Structure of the Roundtable and Working Group Design

The roundtable on the Open Network for Carbon Markets (ONCM) adopted a structured working-group format to facilitate focused, expert-driven deliberations while maintaining coherence across the broader ONCM architecture. By organizing the day around specialized working groups, the roundtable created space for participants to identify technical constraints, regulatory bottlenecks, and implementation risks, and to translate these into concrete pilot-design considerations.

The session was divided into four working groups. Working Group 1 addressed market mechanisms and the regulatory framework for carbon markets, including the role of standards, verification, and policy incentives. Working Group 2 examined technology enablers, such as digital public infrastructure, open protocols, interoperability requirements, and data-sharing architectures. Working Group 3 brought together supply-side actors, including project developers, community-based organizations, MRV providers, and local institutions, to surface on-the-ground implementation challenges and design needs. Working Group 4 focused on demand-side actors- buyers, investors, corporates, and financial institutions- to understand drivers of demand, pricing expectations, and trust requirements for carbon credits.

The day's agenda began with a plenary session by Prof. Srinivasan R (IIMB CDPG), Mr. Sujith Nair (Networks for Humanity- NFH) and Ms. Chaitrali Bhoi (IIMB CDPG) from 9:30 AM to 10:30 AM, during which the ONCM vision, objectives, and intended outcomes were presented, and the structure of the working groups was clarified. From 10:30 AM to 1:00 PM, the four working groups convened parallel discussions, allowing for detailed, comprehensive exploration of key issues in each domain. The allocation of 2.5 hours (10:30 AM –1:00PM) to working-group discussions was deliberately intended to ensure that participants could engage in a thorough, not merely high-level, examination of each domain. Stakeholders underlined that the time was used to surface roadblocks, stress-test assumptions, and document "what must not be missed" when scaling the network, including issues of data quality, governance authority, consent and community rights, and the potential for greenwashing or arbitrage. By explicitly articulating these factors during the working-group sessions, the roundtable aimed to strengthen the conceptual and operational robustness of the proposed pilots and to ensure that the ONCM architecture is field-tested against real-world constraints from the outset.

In the afternoon, from 2:00 PM to 4:00 PM, the working groups reconvened in a synthesis phase aimed at consolidating cross-cutting themes and identifying priority pilot areas for the next phase of the ONCM project. Discussions highlighted the importance of embedding interoperability, governance clarity, and inclusion from the outset, leading to the proposal of several pilot strands for example, standardized credit schemas, digital MRV workflows, interoperable buyer-hub arrangements, and experiments around pricing and demand-generation mechanisms. Participants from across institutions volunteered to contribute to the design, development, and deployment of these pilots, underscoring their commitment to move beyond conceptual discussion toward concrete implementation.

4. Key Outcomes by Working Group

This section synthesizes the outcomes from the four working groups, directly linking the discussions to the key questions and themes in the ONCM Consultation Paper required to navigate the discussions toward actionable pilot designs.

4.1. Working Group 1: Market Mechanisms and Regulatory Framework

Working Group 1 focused discussion on the core questions around defining activity-level regulation for the full credit lifecycle (issuance, MRV, brokerage, retirement); developing cross-border protocols for CBAM/Article 6; establishing FX-like pricing benchmarks; aligning with MoEFCC's regulatory frameworks and BEE's CCTS while creating a regulatory sandbox for Q2 2026 pilots; and proposing MoEFCC/ BEE exemptions for forestry, agroforestry, agricultural, energy sector credits inclusion. Working Group 1 concluded with following outcomes:

- Highlighted need to establish India's own standards for carbon and biodiversity credits.
- Proposed checks and balances against greenwashing and technological misuse.
- Discussed developing a regulatory sandbox for biodiversity and exotic species projects.
- Reflected on tokenization and democratization in reducing transactions and bureaucratic costs

4.2. Working Group 2: Technology Enablers

Discussions in Working Group 2 centered on the themes of adapting Beckn DOFP for credit lifecycles; designing carbon metadata schemas/registry APIs, standardizing MRV protocols

(satellite/GIS); and building payment/settlement protocols for a Q2 transaction prototype. Working Group 2 concluded with following outcomes:

- Emphasized the importance of open networks in creating universal digital infrastructure.
- Discussed design of registries, catalogs and transaction ledgers to address discovery, fragmentation, and trust challenges.
- Highlighted role of geospatial technologies for digital MRV (Measurement, Reporting, Verification).
- Discussed variants in asset quality based on avoidance, reduction, and regenerative types.

4.3. Working Group 3: Supply-Side Actors

Working Group 3 engaged the discussions on the themes of enabling friction-free market access for forestry/NBS developers, MRV and dMRV providers, communities; designing grants/advance payments and co-benefits monetization for smallholders; aggregation models for small land holders/ farmers and FPOs (onboarding protocols); and identifying pilot sites targeting around 2,500–35,000 CCCs for issuance by Q3 2026. Working Group 3 concluded with following outcomes:

- Defined schema for different carbon and co-benefit assets
- Emphasized need for development of a common metric for emission reduction and carbon sequestration.
- Highlighted role of farmer aggregation through FPOs and capacity building needs.
- Underlined importance of cadastral maps linked to land ownership for asset verification.
- Identified NABARD's role in establishing market linkage and capability building of FPOs

4.4. Working Group 4: Demand-Side Actors

Working Group 4 addressed questions like mapping net-zero pathways to ONCM usage/ESG reporting for corporate buyers; designing exchange platforms/scrap markets for different types of carbon credits; pricing transparency/buyer dashboards and securing anchor buyers for pilot testing with around10 live projects. The Working Group 4 concluded with following outcomes:

- Discussed critical demand for drivers beyond compliance markets.
- Highlighted importance of right and transparent pricing of carbon credits to incentivize actual carbon reduction.
- Stressed need for guidelines on verifiable credentials and inclusion of non-carbon data for holistic assessment

4.5. Overall Synthesis Across Working Groups

Across the four working groups, the participants highlighted the following:

a) Markets need to be created: there is an urgent need to establish India-specific standards, with sufficient incentives, checks and balances built on a robust digital architecture.
b) Such an architecture needs to integrate interoperable registries, catalogues, and transaction ledgers to build trust in activities such as dMRV.
c) There is a need to integrate geological assets (geospatial data) and biological assets (forestry, agro-forestry, agricultural, and others) with digital assets – in the form of clearly defined schemas for carbon and non-carbon assets.
d) The participants highlighted the need for expanding the demand from compliance to voluntary carbon markets, with transparent and fair pricing systems, with an explicit goal towards reducing market friction and bureaucratic/ transaction costs.

The synthesis highlighted the need to integrate digital technologies with geological, ecological, and the economics of carbon markets.

5. Participant Commitments and Pilot Pathways

Participants from the roundtable volunteered with strong commitment to the design, development, and deployment of pilot projects that emerged directly from the working group discussions over the duration of Q2 C Q3 of 2026. They identified concrete, actionable pilots aligned with their domain focus, and stakeholders across institutions and organizations signaling a clear intent to operationalize the ONCM architecture beyond conceptual design.

5.1. Working Group 1: Market Mechanisms s Regulatory Framework Pilot Projects

Working Group 1proposed two priority pilots as follows:

- Development of India-specific standards for Measurement, Reporting, and Verification (MRV) and Digital MRV (DMRV), benchmarked against global protocols

while addressing local forestry, agroforestry, agriculture, biodiversity and energy contexts to ensure high integrity and scalability.

- Regulatory sandboxes for three elements: (i) exotic species projects with layered checks against greenwashing, (ii) tokenization mechanisms to reduce transaction and bureaucratic costs for carbon credit lifecycle (iii) aggregation models for smallholders through organizations like Farmer Producer Organizations (FPOs) to enable inclusive participation.

5.2. Working Group 2: Technology Enablers Pilot Projects

Working Group 2 proposed following priority pilots:

- Design and Development of Universal Infrastructure for Digital Assets (carbon credits), comprises four sub-components: (a) schemas defining Quality, Value, and Volume data for credits; (b) provenance tracking for asset origin and lifecycle; (c) pricing mechanisms with FX-like benchmarks; and (d) a distributed, interoperable Transaction Ledger.
- Development of Registry Access APIs
- Defining templates for dMRV certificates.
- Defining geo-tagging of carbon credit assets for geo-spatial verification (and Data Triangulation)
- Design C development of a pilot-stage trading platform to test end-to-end protocol workflows.

5.3. Working Group 3: Supply-Side Actors Pilot Projects

Working Group 3 proposed following priority pilots:

- Define schemas for diverse carbon credit assets (e.g., forestry, agroforestry, algae-based), incorporating critical attributes such as permissions, ownership and tenure rights, mortality risks, sustenance cycles, and a species selection framework.
- This framework includes guidelines for plant/tree/algae types (fruiting vs. non-fruiting), paired with standardized calculation methodologies and a structured Species and Planting Style Selection Framework to ensure verifiable, high-integrity asset registration and scalability for smallholder/FPO aggregation.

5.4. Working Group 4: Demand-Side Actors Pilot Projects

Working Group 4 proposed following suggestions spanning design and development across all three other groups while underlining on building buyer trust and market liquidity through pilots:

- Define alignment of incentives to differentiate emission reductions from offsets measures
- Establishment of pricing transparency across four components (underlying asset value, MRV/dMRV costs, transaction costs, platform fees); and
- Setting up verifiable credentials' frameworks for both carbon and non-carbon data (e.g., co-benefits, ESG metrics) to enable holistic assessment and informed purchasing.

6. Roundtable Outcomes s Pilot Projects Summary

Table 1: ONCM Roundtable Outcomes C Pilot Projects

Working Group	Key Discussion Questions / Themes	Outcomes	Pilots Selected / Derived
WG1: Market Mechanisms s Regulatory Framework	• Activity-level regulation for full credit lifecycle (issuance, MRV, brokerage, retirement) • cross -border protocols for CBAM/Article 6 • FX-like pricing benchmarks • alignment with MoEFCC plans and BEE's CCTS • MoEFCC/BEE exemptions for forestry, agroforestry, agriculture, and energy credits.	• Need to establish India-specific standards for carbon and biodiversity credits • checks and balances against greenwashing and technological misuse • regulatory sandbox for biodiversity and exotic species projects • exploration of tokenization and democratization to reduce transaction and bureaucratic costs.	1. Development of India-specific MRV and DMRV standards for forestry, agroforestry, agriculture, biodiversity, and energy. 2. Regulatory sandboxes for: (i) exotic species projects, (ii) tokenization to reduce lifecycle transaction and bureaucratic costs, (iii) smallholder aggregation via FPOs and similar organizations.
WG2: Technology Enablers	• Adapting Beckn DOFP for credit lifecycles • carbon metadata schemas and registry APIs • standardizing MRV protocols (satellite/GIS) • payment and settlement protocols for a Q2 transaction prototype.	• Importance of open networks for universal digital infrastructure • Designs for registries, catalogues, and transaction ledgers to address discovery, fragmentation, and trust • central role of geospatial technologies in digital MRV • recognition of asset quality variants (avoidance, reduction, regenerative).	1. Design and development of Universal Infrastructure for Digital Assets (carbon credits) with: (a) Quality–Value–Volume schemas, (b) provenance tracking, (c) FX-like pricing mechanisms, (d) distributed, interoperable transaction ledger. 2. Development of registry access to APIs. 3. Definition of templates for dMRV certificates. 4. Definition of geo-tagging standards for carbon credit assets for geospatial verification and data triangulation. 5. Design and development of a pilot-stage trading platform to test end-to-end protocol workflows.

WG3: Supply-Side Actors	• Enabling friction-free market access for forestry/NBS developers, MRV and dMRV providers, and communities • Design of grants, advance payments, and co-benefits monetization for smallholders • Aggregation models and onboarding protocols for small landholders/farmers and FPOs • Identification of pilot sites targeting ~2,500–35,000 CCCs by Q3 2026.	• Defined schemas for different carbon and co-benefit assets • Highlighted need for common metrics for emission reduction and carbon sequestration • Stressed farmer aggregation through FPOs and associated capacity building • Underlined importance of cadastral maps linked to land ownership for asset verification • Identified NABARD's role in market linkage and capability building for FPOs.	1. Definition of schemas for diverse carbon credit assets (forestry, agroforestry, algae-based) including permissions, ownership and tenure rights, mortality risks, and sustenance cycles. 2. Development of a Species and Planting Style Selection Framework with guidelines on plant/tree/algae types (fruiting vs non-fruiting), standardized calculation methodologies, and structures to ensure verifiable, high-integrity asset registration and scalability for smallholder/FPO aggregation.
WG4: Demand-Side Actors	• Mapping corporate net-zero pathways to ONCM usage and ESG reporting • Designing exchange platforms and scrap markets for different credit types • Pricing transparency and buyer dashboards • Securing anchor buyers and pilot testing with ~10 live projects.	• Articulated critical demand drivers beyond compliance markets • Highlighted need for right and transparent pricing of carbon credits to incentivize actual emission reductions • Stressed guidelines for verifiable credentials and inclusion of non-carbon data for holistic assessment.	1. Definition of incentive alignment approaches that differentiate emission reductions from offset measures. 2. Establishment of pricing transparency across underlying asset value, MRV/dMRV costs, transaction costs, and platform fees. 3. Set-up of verifiable credentials frameworks for both carbon and non-carbon data (co-benefits, ESG metrics) to enable holistic assessment and informed purchasing.

7. Appendix 1: Participants of ONCM Roundtable on 1Gth March at IIMB

Table 2:ONCM roundtable Participants

Sr. No.	Name	Affiliation	Working Group Title
1	Chaitrali Bhoi	IIMB CDPG (Project Lead- ONCM)	ONCM
2	Prof. Srinivasan R	IIMB CDPG (Chairperson)	ONCM
1	K Ravichandran	IIFM	Market Mechanism C Regulatory Framework
2	Sneha Thapliyal	NLSIU	
3	Praveena Rai	Multi Commodity Exchange (MCX)	
4	Sudhakar Reddy	NRSC (ISRO)	Technology Enabler
5	Abhimanyu Rathi	RenewCred	
6	Shalabh Jain	CDPG IISc	
7	Arnab Mandal	Tata Trusts	
8	Rajesh Amirthlingam	TCS Sustainability Practices	
9	Elamaran Police	TCS	
10	R V Subramanian	TCS	
11	Suna Akbyir	ARTECH International C Beyond Bar Code	
12	Bachi Allamsetty	Beckn	
13	Sujith Nair	Beckn	
14	Abhishek Sankritik	Finternet	
15	Advait Edgaonkar	IIFM	Supply Side Actors
16	Anvita Pandey	IIFM	
17	Chandan Khanna	Health Care Without Harm	
18	Girish Rao	IIT Madras	
19	Sudhir Subbaraman	iSPIRT, YUVA Unstoppable	
20	P D Jose	IIMB	
21	Komal Shah	SML	
22	Rohit Jain	TATA Motors	Demand Side Actors
23	Ashish Rana	Reliance Industries Limited	
24	Ambuli Nambi K.	TCS	
25	Pankaj Mahadane	TCS	
26	Druvin Hegde	PhonePe	