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Recognising the value of nature and people in India's agri-food value chains: A capital approach for business decision-making

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As India advances towards sustainable agriculture, it is important to consider not just which practices are adopted, but also how their broader effects and value are understood across agri-food value chains. This is especially relevant for farmer-led enterprises, where sustainable practices must support environmental outcomes and viable livelihoods together. While conventional business measures are not designed to capture these, the TEEBAgriFood framework brings dependencies and impacts across natural, produced, human and social capital into enterprise-level decision-making through a holistic accounting approach. In India, farmer are serving as the primary target group applying this approach, bringing dispersed production systems and collective business decisions within a common enterprise framework, and creating a basis for demonstrating and negotiating the wider value of sustainable agriculture practices within markets. Drawing on implementation across Uttarakhand, Uttar Pradesh and Assam, emerging lessons point to how such accounting can inform business decisions, strengthen market propositions and contribute to more nature-positive and resilient agri-food value chains.

Keywords: Capitals approach, Farmer producer organisations, Sustainable agriculture, TEEBAgriFood

INDIAN agriculture is witnessing growing uptake of sustainable agriculture practices, supported by national programmes, incentive mechanisms, certification systems and capacity building efforts. Programme evaluations point to positive results, including water savings, productivity gains, better soil health through greater use of natural inputs, and reduced chemical application. This progress rests on a production base (land and natural resources) that is central to rural livelihoods but highly dispersed.

India has around 145 million operational holdings, with an average holding size of 1.08 hectares (ha) in 2015-16, compared with 1.15 ha in 2010-11. Small and marginal farmers account for over 86% of all holdings, shaping how sustainable practices can be sustained and scaled. The costs of documenting practices, acquiring certifications, and reaching buyers are largely fixed, making them difficult for a small or marginal farmer to bear alone. The ecological benefits of good practices often accrue across an entire landscape. As a result, these benefits can be difficult for individual farmers to measure, verify, and communicate independently.

Sustained productivity gains and food security have been achieved on this base, a considerable achievement. However, the underlying natural resource conditions now warrant continued and sustained efforts. Nearly 30% of India's geographical area is assessed as degraded, soil organic carbon in many cultivated soils remains below optimal levels, and groundwater availability is under pressure in several intensively cultivated regions.

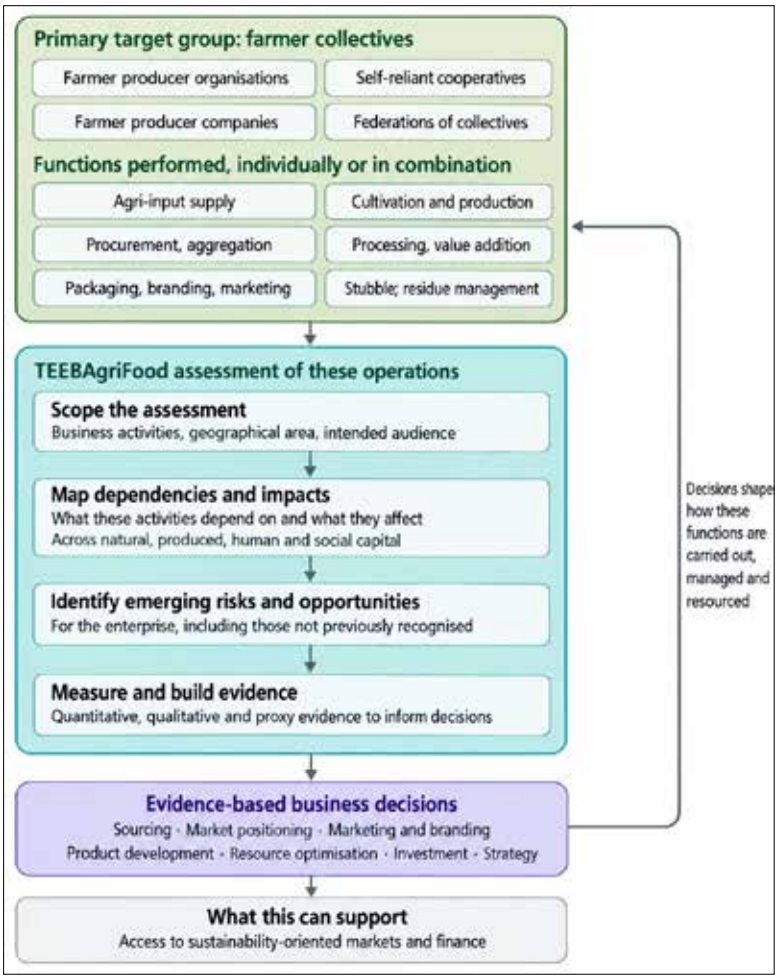
Protecting this production base while continuing to support economic growth and resilient rural livelihoods requires environmental performance, social outcomes and human well-being to be addressed together. Doing so is important in maintaining resilience and competitiveness, and ensuring practices continue beyond the period of programme support. The next step is, therefore, to move beyond adoption alone, towards ensuring that the wider value generated by sustainable systems is recognised in the farmers value chains, demonstrated in economic terms where possible, and appropriately rewarded, creating stronger incentives for farmers to sustain these practices over time.

Recognising the wider value created across the value chain

Agriculture in India affects far more than the commodity or product that reaches the market. Through the process of production alone, farmers depend on and impact soil and water, biodiversity and landscapes (natural capital), draw on social institutions and networks (social capital), build and use knowledge, skills and capabilities (human capital), alongside produced capital such as infrastructure and financial resources that enable production. These relationships extend along the value chain, through aggregation, processing, branding and marketing. Together, these capitals underpin the resilience and long-term performance of an agri-food value chain.

Conventionally, however, these relationships remain largely unrecorded in the value chains. Returns are largely assessed through the quantity, grade and variety of the produce without distinguishing how production practices affect the capitals that underpin production. A practice that depletes groundwater and one that conserves it reach the market on identical terms. The producer cannot readily demonstrate the wider outcomes of a practice, buyers may be unable to verify them and neither the benefits nor the costs are reflected in what the market records.

Bridging this gap requires looking beyond what is produced and sold to understand what agriculture depends upon, what its activities impact, and where value is created across the system. This is where TEEBAgriFood framework becomes relevant to business application in India, bringing the dependencies and impacts across natural, human, social and produced capital, into enterprise-level assessment and decision-making.



Application of TEEBAgriFood framework by farmers in India

Farmers as the enterprise level entry point

Cooperatives, Farmer Producer Organisations (FPOs), Farmer Producer Companies (FPCs) and other collectives provide farmers with structures to conduct business activities together, access markets and strengthen their bargaining power. By bringing dispersed farmers, their practices and their market engagement into a common enterprise structure, farmer collectives serve as a practical unit through which dependencies and impacts on natural, social, human and produced capital can be understood together. Applied at this level, the TEEBAgriFood framework provides a basis for understanding and demonstrating, in economic terms where possible, the risks and opportunities associated with different production and business choices across the four capitals.

This matters the most where environmental and social outcomes associated with sustainable agricultural practices are dispersed across farms. For instance, farmers may individually contribute to soil health, water conservation, biodiversity, and maintain and apply traditional knowledge, but often lack the scale or market interface to document and communicate these contributions. This is particularly relevant in agro-ecologically complex, hill and forest-fringe regions, where farm holdings are often small and biodiversity and ecosystem-service values can be significant.

The TEEBAgriFood India application therefore works with farmer-led enterprises not simply as adopters of sustainable practices, but as businesses capable of mapping how their business activities interact with nature and people, and of building evidence that can inform decisions across the value chain, from production and aggregation to processing, marketing and investment. It applies both to enterprises already pursuing sustainable practices and to those considering a transition, allowing the assessment to inform decisions about potential pathways as well as document existing practices and outcomes.

Farmers perform functions across value chains and can serve as an important bridge between farms and

What is a capital approach?

The capitals approach recognises that economic activity both depends upon and affects natural, human, social and produced capital, and that changes in these capitals can influence the resilience, risks and opportunities of enterprises and wider economic systems.

emerging market expectations. Agricultural markets have traditionally rewarded productivity and financial returns. These remain essential, but larger buyers and businesses are increasingly looking beyond conventional measures of agricultural performance. Sustainable consumption and production, biodiversity conservation, climate resilience and deforestation-free supply chains are beginning to influence sourcing strategies and business decisions. Individual farmers may have limited capacity to respond to these expectations directly. A collective can, and in doing so can create conditions through which the wider effects of its operations can be recognised, communicated and where appropriate reflected in what the value chain rewards.

The potential to build on this considerably give their growing importance as an institutional interface for public and development interventions. India has successfully created farmer-owned institutions at scale as over 10,000 FPOs have been formed since 2020-21, and a wider ecosystem of public support is growing around them. National Bank for Agriculture and Rural Development, Small Farmers' Agribusiness Consortium and National Cooperative Development Cooperation, have supported farmer collective development, while programmes including the 'Agriculture Infrastructure Fund' and the 'PM Formalisation of Micro Food Processing Enterprises scheme' have strengthened the ecosystem around farmer-owned enterprises. Government departments, development agencies and civil society organisations increasingly work through collectives to connect farmers with knowledge, finance, technology and markets. These collectives therefore sit at the point of convergence between farmer priorities, public investment, civil society support, and market engagement.

A collective proposition, however, is only as strong as the evidence behind it. This is where TEEBAgriFood initiative in India contributes through targeted capacity building efforts supports farmer collectives in looking beyond conventional financial and production measures and examining their activities through a capitals approach.

From good agricultural practices to value proposition: Applying the capitals approach in India

The TEEBAgriFood initiative in India is led by UNEP, with the research component implemented by the ICAR-Indian Institute of Farming Systems Research (IIFSR) and Indian Institute of Forest Management (IIFM), and the business engagement component led by the Centre for Responsible Business (CRB). The business workstreams the initiative works with farmer collectives across Uttarakhand, Uttar Pradesh and Assam for building their capacity to apply the TEEBAgriFood framework themselves, drawing on the TEEBAgriFood Operational Guidelines for Business, developed and launched in 2023, to address the need for practical guidance on applying the capitals approach at the enterprise level. The guidelines recognise that conventional business assessments tend to focus primarily on financial and production outcomes, while agricultural enterprises also depend on and influence a wider range of environmental, social and human capitals. This allows them to understand and demonstrate the wider dependencies, impacts, risks and opportunities associated with the agricultural practices they undertake, including organic agriculture, natural farming and agroforestry.

The approach to applying TEEBAgriFood framework in India by businesses builds on the strengths and practices particular to each state rather than introducing a common model of sustainable agriculture. Across the three states, farmer collectives and businesses are operating systems that carry significant environmental, social and economic value. What has been missing is a way to document that value and put it before the market. The state examples below illustrate what those systems look like:

- In Assam, the *bari* model enables households, and women to supplement income alongside their main agricultural activity. Moreover, the state supports a diversity of agroforestry and integrated production systems, including shade grown tea in Dibrugarh (Upper Brahmaputra Valley Zone), fisheries in Morigaon (Central Brahmaputra Valley Zone), and paddy and citrus in Darrang and Tezpur (North Bank Plains Zone). Enterprises engaged here have shown a marked orientation towards conservation of the natural resource base and strong collective functioning, both of which the assessments seek to document.





TEEBAgriFood framework application trainings in Uttarakhand (*left*) and Assam (*right*)

Pahadi Utpad Swayatt Sahkarita, Uttarakhand

Pahadi Utpad Swayatt Sahkarita is a self-reliant cooperative connecting 1,500 beekeepers in 122 villages across seven districts of Uttarakhand, dedicated to conserving the native bee *Apis cerena indica* and the traditional knowledge and skills that sustain it. After a year with the TEEBAgriFood initiative, the cooperative now tracks knowledge creation, livelihood opportunities generated and local incomes generated by these practices.

Using structured scorecards, the cooperative records beekeepers' knowledge across colony management, queen bee identification, disease and pest control, seasonal practices and honey quality, alongside skills in value addition, marketing and record keeping. Beside this, the income assessment tracks production and sales of honey, wax, bee pollen and propolis, costs, net income and profitability from traditional beekeeping.

By weaving these insights into storytelling, the cooperative is moving from having an impact to actively communicating the unique value that traditional Himalayan honey brings to communities and markets.





- In Uttar Pradesh, FPCs practicing organic farming have adopted vermicompost and other natural fertilisers to maintain soil health and nutrient levels. Businesses have moved into bio-input production and are repurposing agricultural residues, including sugarcane bagasse and wheat and rice stubble, as part of emerging bio-economy models. This orientation towards innovation and entrepreneurship offers a clear case for examining how such practices and business models generate value while addressing resource constraints.
- In Uttarakhand, elevation-driven agro-climatic zones support a wide range of commodities from horticultural fruits, medicinal and aromatic plants to diverse millets. In the hill regions, many farmers rely on low-input or 'organic by default' practices, drawing on traditional knowledge to manage soil, water and biodiversity in difficult conditions. Women hold a central role in sustaining these systems and the knowledge behind them, including decisions on crops, inputs and the use of locally available resources.

TEEBAgriFood for business implementation in India is closely supported by state-level civil society organisations: Jagriti Enterprises in Uttar Pradesh, the People's Science Institute in Uttarakhand and ICCO in Assam. These partners anchor the work in their respective states and support capacity development at both the CSO and farmer-collective levels. Through business profiling, state-level training workshops, India-contextualised workbooks and continued handholding, more than 100 FPOs and FPCs across the three states are currently undertaking TEEBAgriFood assessments. These systems provide the starting point for most enterprise assessments. Rather than asking whether a practice is sustainable, the assessments examine what these production systems depend upon, what they affect, what value they create, and how these relationships can inform business decisions.

Aarambhsheel Kisan Utpadak Sanghthan Sehkari Samiti Ltd., Uttar Pradesh

Aarambhsheel Kisan Utpadak Sanghthan Sehkari Samiti Ltd., an FPO in Hapur, Uttar Pradesh, set up in 2022 with a focus of producing oil from organically grown mustard. Since then, the FPOs has grown from 37 to 800 farmers across 18 villages, with a marked increase in its annual turnover. The FPO's engagement with the TEEBAgriFood initiative has extended their view beyond measuring production and financial performance to now examining soil health improvement, reduction in chemical use, and impact of farmer skills and training on its organic mustard oil segment. On this basis, the FPO plans to expand organic mustard production and demonstrate what organic farming delivers, to farmers considering the shift to organic practices.



Eritech Silk Federation, Assam

Eritech Silk Federation, a Section 8 company in Assam, brings together over 600 Eri silk farmers and 250 weavers, many of whom are rural women skilled in traditional hand-spinning. Through the TEEBAgriFood assessment, the Federation has begun to recognise and track how Eri silk production sustains traditional knowledge, supports rural livelihoods and returns discarded cocoons to use rather than waste.

Approximately 80 kg of handspun silk waste is being upcycled into Made ups as well as handicrafts with associated farmers, weavers and artisans benefiting from training on value addition of Eri silk cocoon and natural dyeing; silk weaving.

Sharing this evidence has strengthened trust in the Federation's work and given weight to what Eri silk represents: craftsmanship carried by rural women, livelihoods sustained close to home, and a material produced without waste.





Impact across Uttarakhand, Uttar Pradesh and Assam

For businesses, the assessment is not merely an exercise but a different way of looking at the business operations. A shift in perspectives and behaviour has been emerging across Uttar Pradesh, Uttarakhand and Assam where agricultural enterprises are moving from conventional balance sheets to holistic assessment of their impacts on natural, social and human capital.

Convergence of public-private action

The TEEBAgriFood India initiative brings together two complementary streams of evidence. Landscape-level research carried out by ICAR-IIFSR and IIFM, examines how sustainable agricultural systems and practices contribute to the natural capital and ecosystem services as well as social and human capitals, while enterprise level assessments examine how these relationships affect business decisions, including sourcing, market positioning, investment and resource use. The two perspectives address different but connected questions: why particular production systems matter, and what it would take for value-chain actors to act on that understanding.

Bringing these perspectives together requires engagement among farmers, businesses, researchers, civil society and public institutions. To support this, the programme has convened seven public-private dialogues at state and national levels, using evidence and experience from FPOs, FPCs and other value-chain actors to identify priorities and opportunities for action. The dialogues are now informing roadmaps for strengthening nature-positive value chains in Uttarakhand, Uttar Pradesh and Assam, with attention to the specific commodities, production systems and institutional conditions in each state.

In this context, nature-positive value-chain development means strengthening value chains rooted in traditional varieties, indigenous knowledge and sustainable production practices while maintaining or enhancing the natural resource base on which production depends. The emerging roadmaps seek to identify practical opportunities to combine natural-resource conservation and restoration with income and livelihood improvements, including through resource efficiency, value addition and market approaches that can recognise positive environmental outcomes. The aim is to provide a basis for coordinated action by producers, buyers, financiers and policymakers, linking evidence on agricultural systems with the decisions that shape their future development.

SUMMARY

Taken together, these outputs seek to demonstrate the value of taking a more integrated approach to decision-making, where considerations of nature and people are incorporated alongside economic and production outcomes. This is particularly relevant in India's agri-food value chains, where challenges such as declining soil health, water stress and climate variability can have significant implications for long-term productivity and business resilience, while often remaining less visible within conventional measures of performance.

The programme forms part of a broader ecosystem of government, industry and financial actors advancing approaches to accounting, incentives and investment that recognise a wider range of environmental, social and economic values within the agri-food system. In this context, the programme's contribution is to generate practical evidence and demonstrate how such approaches can be applied at enterprise and value-chain levels.

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