Himalayan Hemp®

The CO2 Cash Crop:
Hemp, Carbon Credits, and the Future of Indian Agriculture

Himalayan Hemp® -High Impact Consulting

A Policy Report for Hemp Cultivation and Carbon Credits

This comprehensive report is designed to inform Indian policymakers, entrepreneurs, agricultural experts, and climate finance professionals, about the transformative potential of industrial hemp cultivation.

Specifically, we explore its dual benefits: strengthening rural economies and significantly contributing to India's climate change mitigation goals through carbon sequestration and the emerging carbon credit market.

The purpose is to provide a detailed, evidence-based roadmap for integrating hemp into sustainable agricultural practices, addressing both the agronomic and regulatory pathways required for successful, large-scale adoption across the nation.

Index

Himalayan Hemp® -High Impact Consulting

Introduction and Overview of Hemp Cultivation in India

Background and Purpose

The global imperative for climate action, underscored by India's ambitious goal of achieving **Net Zero by 2070**, demands we transform the agricultural sector, which currently accounts for **13% to 22%** of the nation's GHG emissions.

Industrial hemp is a strategic answer: one hectare can absorb up to **22 tonnes of CO 2** per cycle, making it more efficient than agroforestry.

This report provides a clear roadmap for clients to leverage hemp's superior performance to generate **quantifiable carbon credits**, enabling them to participate directly in India's climate resilience goals while significantly enhancing farm income and national sustainability.

Overview of Hemp Cultivation

Industrial Hemp is a **(<0.3 THC**) triple-yield crop offering seed (protein/oil), fiber (textiles/ composites), and hurd (construction/biofuel).

Hemp yields up to **3*** more usable fiber per hectare than forests and is poised to displace water-intensive crops, fueling a projected market of over **₹12,000 crore** by **2027** (**CAGR 23%**)

Crucial Opportunity: Current official cultivation in India is negligible, representing less than **0.001%**of the total **180 million** hectares of agricultural land.

This near-zero starting point highlights a massive, **untapped opportunity for entrepreneurs and farmers** to pioneer and scale commercial farming across the country.

Importance of Carbon Credits

Carbon credits are the **crucial financial leve**r needed to scale climate action in rural India.

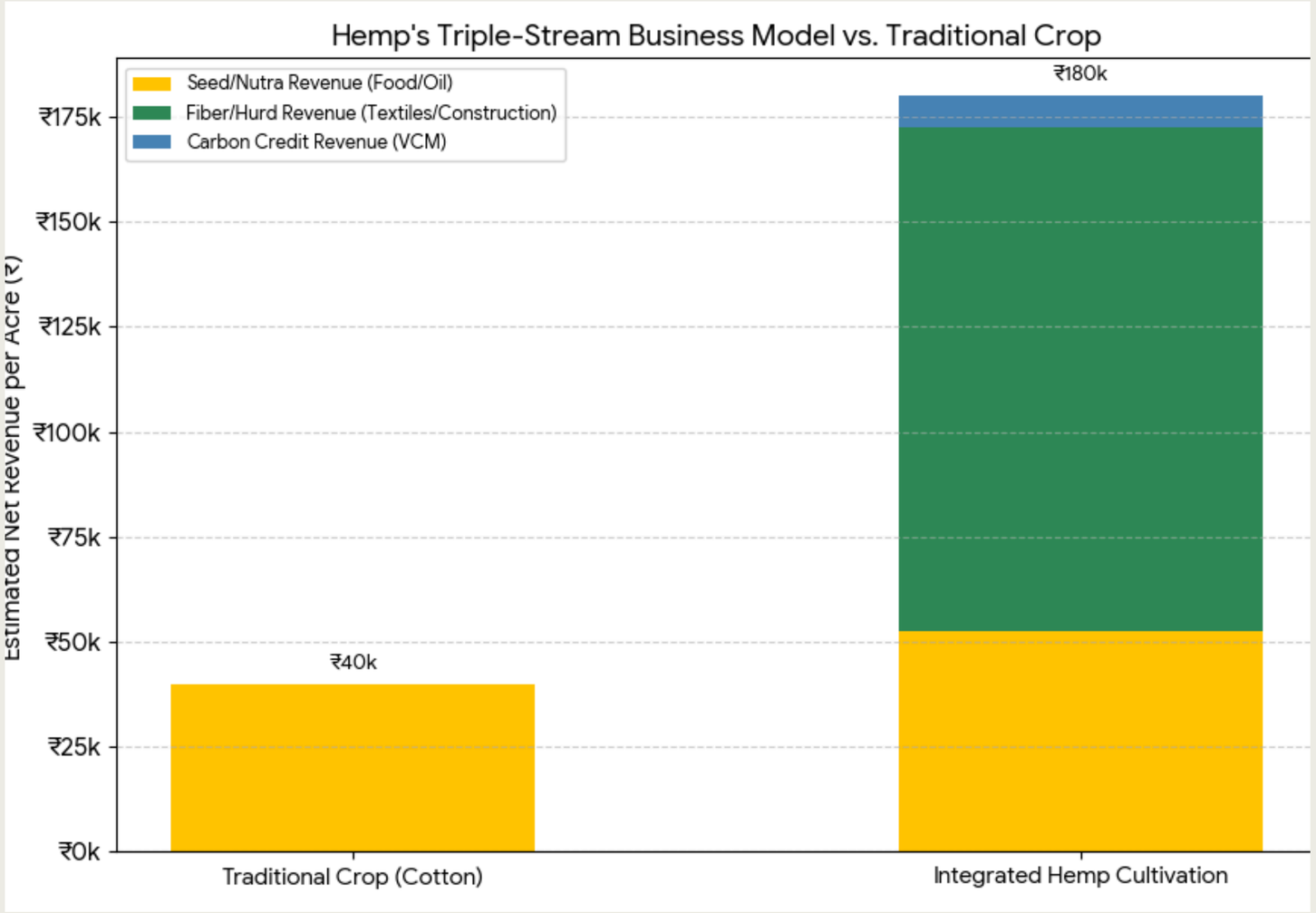
Leveraging the **Voluntary Carbon Market (VCM)** through hemp cultivation creates a 3-part funding mechanism: it monetizes the CO2 sequestered **(valued at ₹1,250 per tonne),** incentivizes the adoption of modern **MRV technology,** and ensures a **sustainable, off-market income source** for rural communities engaged in climate mitigation and ecological restoration.

This model is key to attracting global green investment into the agricultural sector.

Current Status and Economic Potential

The opportunity to capture the **₹12,000 crore** market (projected to hit (CAGR 23% by 2027) is bottlenecked by **regulatory failure**. Despite pioneers like Uttarakhand **(since 2015)** establishing frameworks, actual commercial cultivation remains near-zero, covering less than **0.001%** of India's available farmland due to f**ederal seed import restrictions** and **inconsistent THC testing standards.**

This chaos is an opportunity for clarity: the recent Himachal Pradesh pilot **(Jan 2025),** aimed at generating **₹500 crore** revenue, necessitates the creation of new university-backed labs and clear SOPs, underscoring the urgent need for a **centralized national policy**. **Hemp entrepreneurs** must lead this push, championing technology like **geotagging** to verify sequestration of **10-22** tonnes of **CO2 per hectare** and monetize the plant's **3x fiber** yield and its potential **₹3 lakh** net return per acre.



Carbon Sequestration and Quantification

Mechanisms of Carbon Capture	Scientific Evidence & Benchmarks	Quantification Methods
Hemp is a **champion carbon capturer** because it works fast and stores deep. The plant acts as a high-speed vacuum, absorbing atmospheric carbon during its short, **90-120 day growth cycle**. The carbon is stored in two key ways: **Biomass Vault**, where carbon is locked into the dense stalk for decades when used in products like **Hempcrete**, and **Soil Anchor,** where the deep root system pumps carbon into the soil, enhancing soil organic matter and mitigating erosion, making it highly valuable for verification.	Global studies indicate **hemp** can sequester between **8 to 22** tonnes of **CO 2** per hectare annually, often double that of forests grown in the same period. Establishing India specific data benchmarks, tailored to local soil types and climate, is essential for **credible credit generation.**	Accurate measurement, reporting, and verification **(MRV)** is paramount. We propose methodologies aligned with major global standards (e.g., Verra, Gold Standard), focusing on **baseline emissions, biomass sampling, soil carbon analysis** (up to 30cm), and lifecycle assessments for permanence

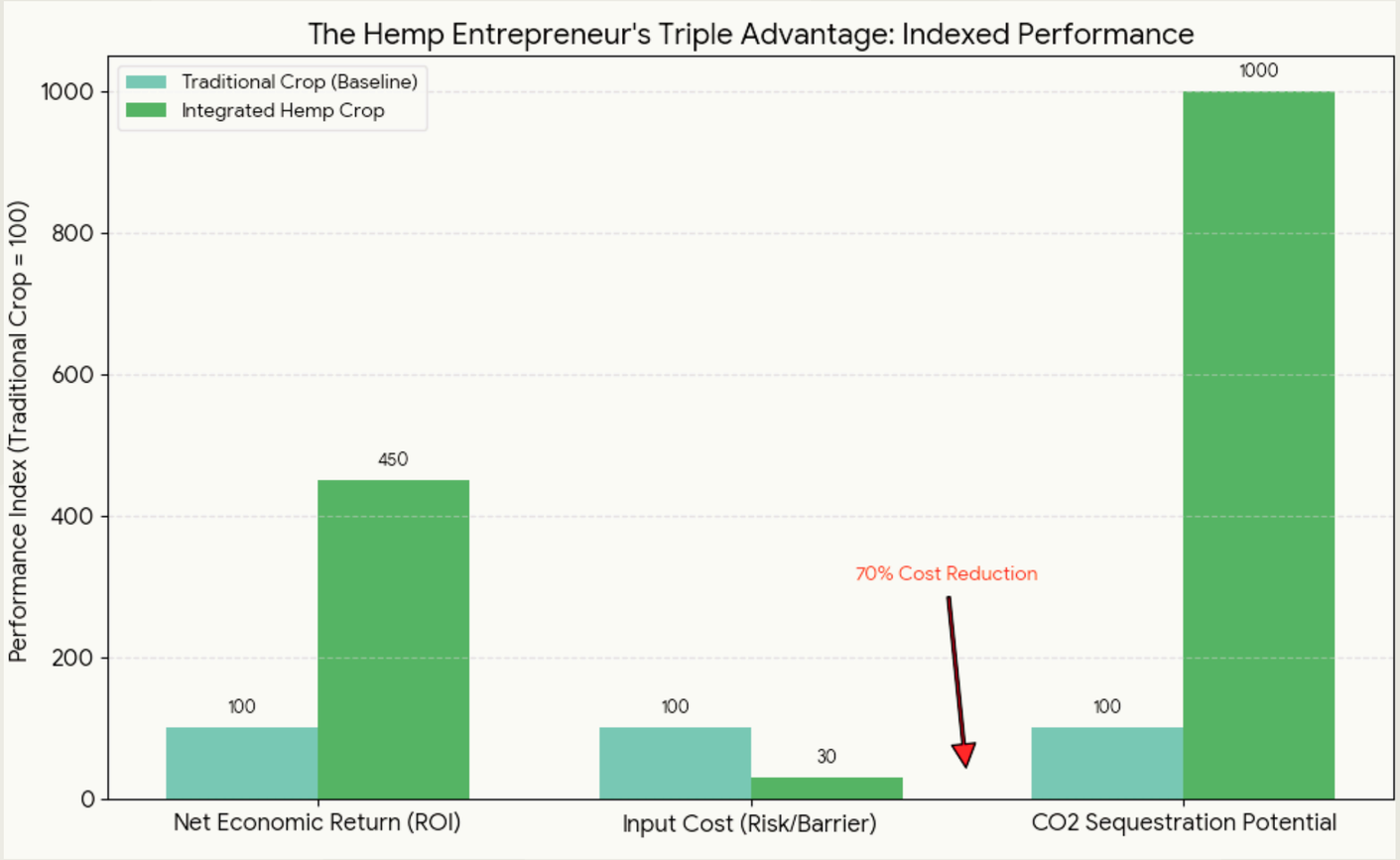
Hemp acts as a potent and rapid carbon sink, making it highly valuable in time-bound climate strategies. The durability of carbon stored in hemp-based construction materials offers long-term sequestration benefits, linking agriculture directly to green infrastructure development

Navigating India's Carbon Credit Market

Voluntary vs. Compliance Markets	Policies, Regulations, and Certification	Role of Hemp in India's Carbon Market
India's carbon market operates primarily in two spheres. The **Voluntary Carbon Market (VCM)** offers immediate access for agricultural projects, allowing private entities to buy credits. The **impending Compliance Market,** driven by the Carbon Credit Trading Scheme (CCTS), will likely mandate participation from heavy emitters, increasing demand and stabilizing prices for high-quality, nature based solutions like hemp credits.	Clarity on **MRV protocol**s is crucial. Projects must navigate domestic regulations under the **Ministry of Power** and secure certification from internationally recognised bodies to ensure credits are **tradable and command premium pricing**. Simplifying the process for farmer collectives and small projects is a **key policy recommendation**	Hemp provides a crucial supply stream of **high-integrity, nature-based carbon credits** that can help India meet its **Nationally Determined Contributions (NDCs).** It also offers diversification for the **carbon market beyond forestry,** catering to buyers seeking agricultural or bio-based offset solutions.

The Financial Incentive - The ability to monetize carbon sequestration through credit sales adds a secondary, non-volatile revenue stream for farmers, making hemp farming more resilient to commodity price fluctuations. Effective aggregation mechanisms are needed to pool small farm outputs into viable credit projects

Comparative Analysis: Hemp vs. Traditional Cash Crops



Hemp offers superior environmental performance and competitive economic returns compared to traditional, resource-intensive cash crops like cotton and rice

The shift to hemp is not just an environmental choice; it's an economic de-risking strategy for millions of Indian farmers facing climate vulnerability and rising input costs

Diverse Opportunities and Value Chains

Agroecological Benefits

Hemp acts as a potent phytoremediation agent, drawing toxins from the soil. It requires minimal pesticides and its deep taproot structure improves soil aeration, water infiltration, and sequesters carbon, making it excellent for crop rotation.

Textile and Construction

Hemp fiber is highly sustainable, replacing synthetic and high-water-demand cotton. Hemp hurd is the basis for carbon negative construction materials like 'hempcrete,' crucial for green building initiatives.

Nutrition and Bioenergy

Hemp seeds are a complete protein source rich in Omega fatty acids. Furthermore, the residual biomass offers potential for biofuel and bio-char production, integrating hemp into the circular bio economy

Hemp's versatility creates vast opportunities across multiple high-value industries, facilitating economic diversification beyond primary agriculture.

Adoption Barriers and Strategic Challenges

Adoption Barriers for Smallholders

Lack of initial capital for specialised processing equipment, limited knowledge of agronomic best practices for industrial varieties, and fear of regulatory non-compliance hinder small farmers from transitioning to hemp cultivation. Education and subsidized seed programs are necessary.

Institutional and Market Access Issues

Developing a stable market requires established minimum support prices, reliable off-take agreements, and decentralized primary processing facilities (decortication) near farm clusters. Current market fragmentation increases farmer risk.

Social Acceptance and Awareness

Addressing the historical stigma associated with cannabis is paramount. Public awareness campaigns must clearly differentiate high-THC narcotic cannabis from low-THC industrial hemp, emphasizing its fibre, seed, and environmental benefits

Legal and Regulatory Challenges

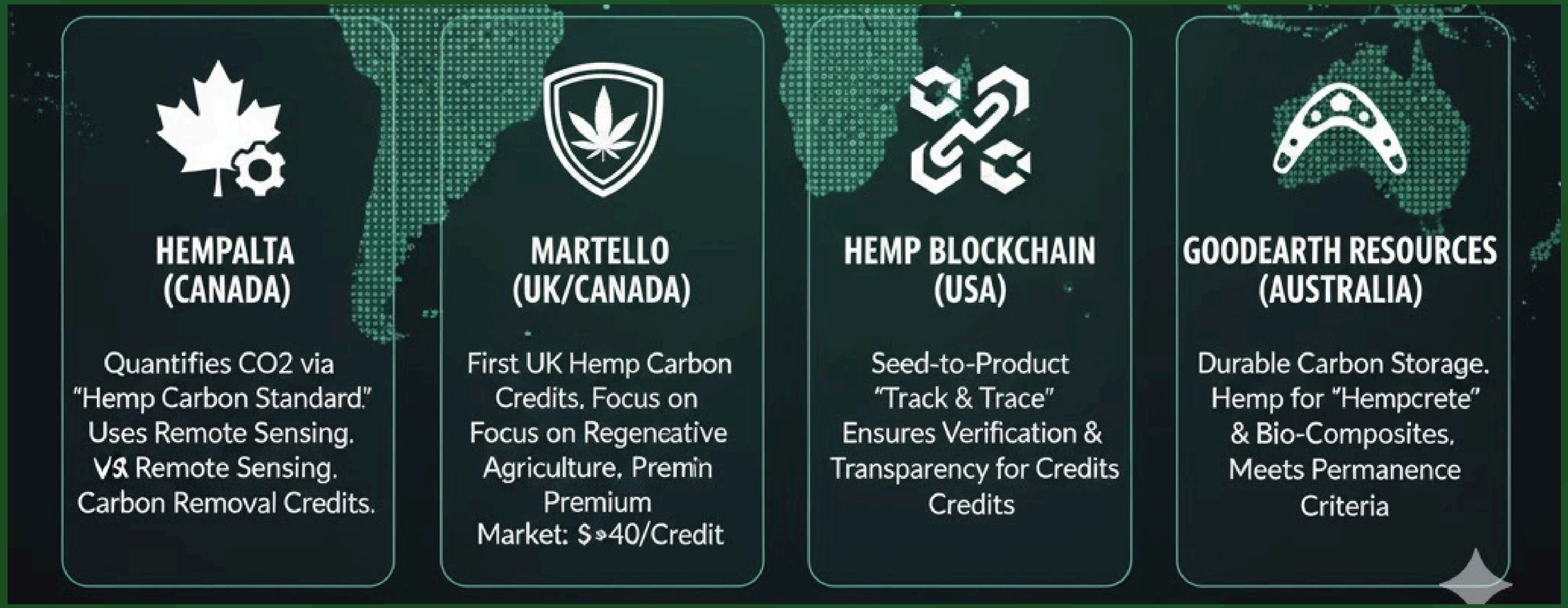
Inconsistent state-level regulations and complex licensing procedures create operational uncertainty. Harmonisation of THC limits (globally acceptable 0.3% standard) and streamlined permit processes are essential for attracting large-scale investment

Despite the immense potential, widespread adoption faces significant hurdles that require coordinated intervention from regulators and the private sector

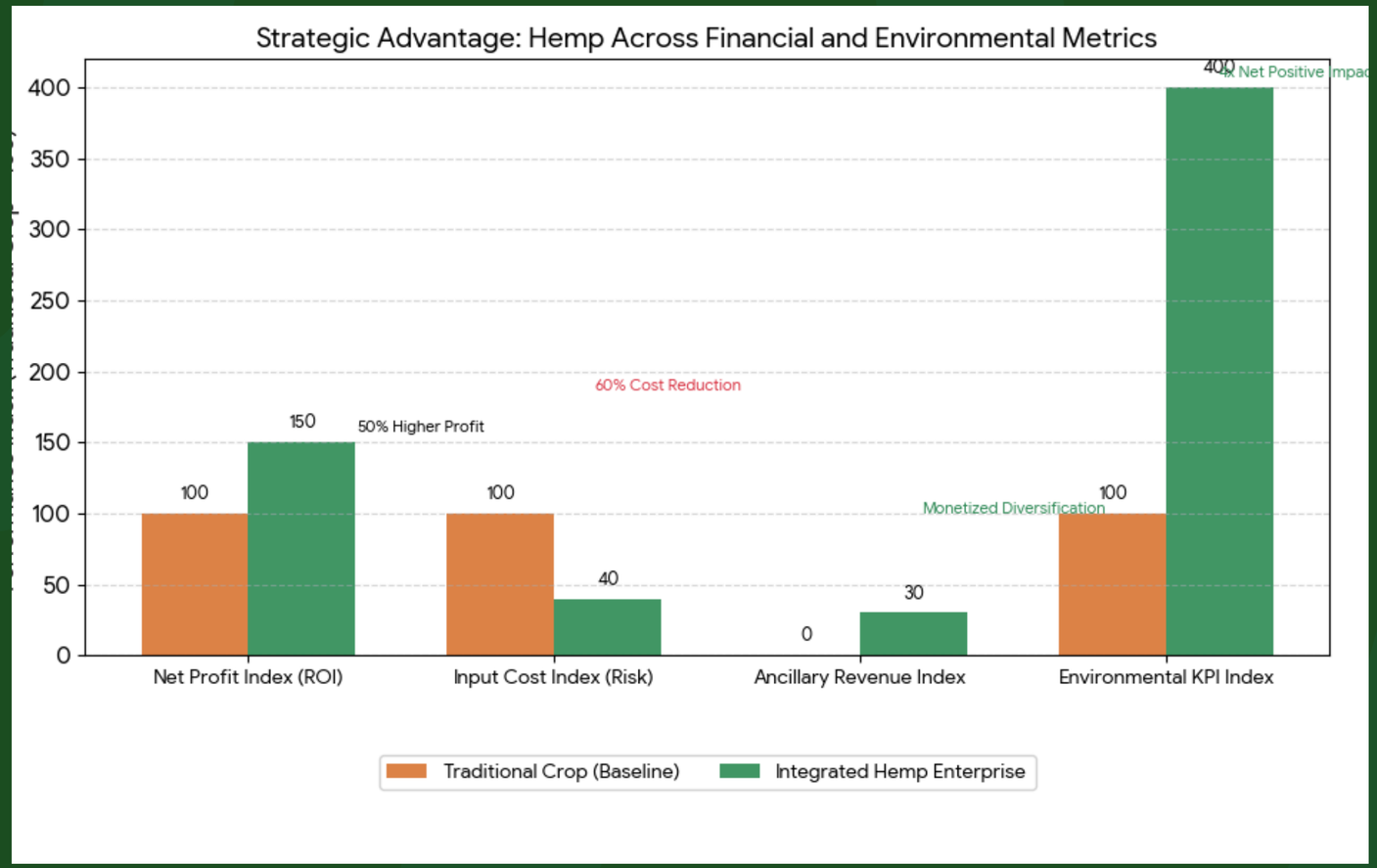
Case Studies and Regional Initiatives

State	Status	THC Limit	Focus/Note
Uttrakhand	**First to License** (2018)	<0.3%	Has issued the most licenses and is the **current hub for production** (fiber and seed) under government supervision. Projects are often Public-Private Partnerships focused on economic upliftment.
Uttar Pradesh	**Research Focused**	<0.3%	Has issued licenses primarily for **purposes** in collaboration with institutes like (CSIR-NBRI) to develop compliant, high-yielding varieties.
Himachal Pradesh	**Pilot Project Stage**	<0.3% and no-limit THC seeds for medicinal purposes	Approved a pilot study in **January 2025** to explore medicinal and industrial potential. The project involves agricultural universities and mandates **geo-tagging** and specialized **lab infrastructure** for compliance and high-quality seed development.

Lessons from International Experiences



Economic Feasibility and Business Models



- Farmer Profit Increase (50%): Highlights the significant boost in net income per hectare, driven by carbon credit sales and diversified products.
- Revenue Diversification (30%): Shows the substantial portion of farm revenue generated from non-primary streams, adding resilience.
- Cost Reduction (15%): Emphasizes the efficiency gains from lower water and pesticide requirements, directly impacting the bottom line

Analysing the financial returns demonstrates that hemp, especially when coupled with carbon credit revenue, offers a highly attractive agricultural enterprise

Future Directions and Policy Recommendations

Scaling Up and Research Needs

Invest significantly in R&D to develop high-biomass, locally adapted hemp varieties. Establish national research centres dedicated to hemp agroforestry and low-cost decortication technology. Focus on pilot programs that scale up cultivation in climate-vulnerable zones.

Policy and Regulatory Harmonisation

Implement a uniform National Hemp Policy that standardizes THC limits (0.3%), streamlines licensing across states, and clearly segregates industrial hemp from narcotic substances. The policy must clearly recognize hemp as an agricultural carbon credit eligible crop

Market Development and Financial Support

Develop mechanisms for the aggregation and verification of carbon credits from small farmers. Offer subsidized loans and financial incentives for investors setting up industrial hemp processing units. Introduce a Minimum Support Price (MSP) for hemp to provide income security

Role of Stakeholders

Government must facilitate the regulatory framework; the Private Sector (agribusiness, textile, construction) must ensure stable off-take agreements; and NGOs must focus on farmer education, capacity building, and facilitating MRV adherence

Curious to Know more about Hemp and its Opportunities?

Connect with **Himalayan Hemp® and High Impact Consulting** to explore unparalleled hemp opportunities and secure expert consultation for your sustainable Hemp ventures.