

NIIR PROJECT CONSULTANCY SERVICES

NPCS

CLIENT CASE STUDY

Strategic Investment in
Citric Acid Manufacturing

Powered by NPCS Techno-Economic Advisory

Client

M/s. Indian Potash Ltd

Coimbatore, Tamil Nadu, India

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Transforming Investment Vision into Industrial Reality

1. About Niir Project Consultancy Services (NPCS)

Niir Project Consultancy Services (NPCS) is one of Asia's most trusted industrial knowledge and advisory organizations, with over four decades of experience in techno-economic feasibility studies, Detailed Project Reports (DPRs), market research, and engineering advisory services. Headquartered in India, NPCS serves clients across manufacturing, agro-industry, chemicals, pharmaceuticals, food processing, and emerging sectors globally.

"NPCS is part of Asia's leading industrial knowledge ecosystem — with thousands of project profiles and global consulting expertise spanning 50+ countries."

Core Services

Detailed Project Reports (DPR)

Bankable, investor-grade project reports covering every aspect of manufacturing setup.

Techno-Economic Feasibility Studies

In-depth assessment of technical viability, financial returns, and market positioning.

Market Research & Demand Analysis

Sector-specific intelligence covering domestic consumption, import-export trends, and growth forecasts.

Engineering & Implementation Advisory

End-to-end support from plant layout to machinery selection and phased rollout planning.

2. NPCS — Authority & Track Record

30,000+

Project Reports
Published

50+

Countries Served

30+

Years of Expertise

250,000+

Industrial Projects
Delivered

3. Project Snapshot

Particulars	Details
Client Name	M/s. Indian Potash Ltd
Location	Coimbatore, Tamil Nadu, India
Industry Segment	Specialty Chemicals / Industrial Manufacturing
Project Recommended	Citric Acid Manufacturing Unit
Consultancy Scope	Techno-Economic Feasibility Study & Detailed Project Report (DPR)

Implementation Status	Approved for Project Execution
Advisory Partner	Niir Project Consultancy Services (NPCS)

4. Client Overview

M/s. Indian Potash Ltd is a reputed, large-scale enterprise with an established presence in India's agri-input and industrial supply ecosystem. With a strong distribution network, regulatory compliance framework, and deep understanding of domestic and international markets, the organization has consistently delivered value across its business verticals.

Recognizing the need to diversify and future-proof its revenue base, Indian Potash Ltd sought to enter a new, high-growth manufacturing segment. The leadership team identified the following strategic investment criteria:

Strategic Objectives

- Long-term profitability with scalable production capacity
- Sustainable raw material sourcing from the region
- Strong domestic and export market demand visibility
- Alignment with green and eco-friendly manufacturing trends
- Reduced dependency on third-party suppliers

Why NPCS Was Chosen

- Proven track record in industrial DPR and feasibility studies
- In-depth knowledge of the chemical manufacturing sector
- Data-driven, unbiased project recommendations
- End-to-end support from ideation to implementation
- Recognized authority in 50+ global markets

5. Problem Statement & Challenges

Before engaging NPCS, Indian Potash Ltd faced several critical challenges in identifying and evaluating a viable large-scale manufacturing investment:

Challenge	Details
Market Intelligence Gap	Limited internal capability to identify high-potential specialty chemical manufacturing opportunities.
Technical Complexity	Citric acid production involves bio-fermentation processes requiring specialized technical evaluation and process engineering expertise.
Financial Risk Assessment	Uncertainty around capital investment requirements, projected returns, and payback timelines for a large-scale industrial project.
Raw Material Availability	Need to assess sustainable and cost-effective availability of carbohydrate-rich substrates (molasses, maize) in the region.
Regulatory & Compliance Framework	Navigating environmental clearances, industrial licensing, and effluent treatment compliance requirements.
Supply Chain & Market Access	Identifying institutional buyers and establishing reliable off-take channels in domestic and export markets.

6. NPCS Approach & Methodology

NPCS deployed its proven five-stage consultancy methodology to address Indian Potash Ltd's investment brief comprehensively:

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Project Identification	Market Analysis	Technical Feasibility	Financial Modeling	Implementation Strategy
<ul style="list-style-type: none"> Industrial landscape scan Opportunity mapping Sector shortlisting 	<ul style="list-style-type: none"> Demand assessment Competition study Import-export data 	<ul style="list-style-type: none"> Process evaluation Machinery selection Plant layout 	<ul style="list-style-type: none"> CAPEX/OPEX IRR & ROI Payback analysis 	<ul style="list-style-type: none"> Phased rollout Risk mitigation Regulatory roadmap

This structured approach ensured the client received a holistic, bankable, and actionable roadmap — rather than a generic market overview.

7. Business Opportunity Identified — Citric Acid Manufacturing

After conducting a rigorous, multi-parameter techno-economic assessment and location-based industrial evaluation, NPCS identified the establishment of a Citric Acid Manufacturing Unit as the most strategically aligned opportunity for Indian Potash Ltd.

Why Citric Acid?

Citric acid is the world's most widely used organic acid, with applications spanning a diverse range of high-growth industries:

- ▶ Food & Beverage Processing — as an acidulant, preservative, and flavor enhancer
- ▶ Pharmaceuticals — excipient, effervescent formulations, API stabilizer
- ▶ Cosmetics & Personal Care — pH adjuster, skin care formulations
- ▶ Detergents & Cleaners — eco-friendly chelating and descaling agent

- ▶ Textile Processing — fabric treatment and finishing applications
- ▶ Nutraceuticals & Health Supplements — growing demand globally
- ▶ Industrial Chemical Formulations — metal treatment and surface cleaning
- ▶ Construction Chemicals — retarder in cement and concrete applications

8. Scope of Services Delivered by NPCS

NPCS provided end-to-end consultancy support, delivering the following workstreams as part of the engagement:

Technical Deliverables

Commercial & Financial Deliverables

- Market demand and growth analysis

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| <ul style="list-style-type: none">• Manufacturing process design and evaluation• Plant layout and capacity planning• Key machinery identification and supplier benchmarking• Raw material sourcing strategy (molasses, maize substrates)• Utility and fermentation system requirements• Effluent treatment and environmental compliance plan• Packaging, storage, and logistics infrastructure design | <ul style="list-style-type: none">• Competitor landscape and import substitution study• Capital investment (CAPEX) and operating cost (OPEX) estimation• Revenue projections and profitability modeling• IRR, ROI, and payback period calculations• Risk assessment and mitigation strategies• Phased implementation roadmap and milestones |
|---|--|

9. Project Execution Timeline

NPCS structured the engagement into clearly defined phases to ensure timely delivery and stakeholder alignment:

Phase	Duration	Key Milestones
Phase 1 — Opportunity Assessment	Weeks 1–3	Sector scan, opportunity shortlisting, stakeholder alignment
Phase 2 — Market & Demand Analysis	Weeks 4–6	Primary/secondary research, competitor mapping, demand forecasting
Phase 3 — Technical Feasibility	Weeks 7–9	Process design, machinery list, plant layout, utility assessment
Phase 4 — Financial Modeling	Weeks 10–11	CAPEX/OPEX estimation, revenue model, IRR and payback projections
Phase 5 — DPR Compilation & Review	Weeks 12–13	Report drafting, internal review, client presentation
Phase 6 — Client Approval & Handover	Week 14	Final DPR delivery, implementation advisory, project sign-off

10. Technical Insights — Citric Acid Manufacturing Process

Citric acid is commercially produced through submerged fermentation of carbohydrate-rich substrates using *Aspergillus niger*. The process is well-established, scalable, and compatible with locally available raw materials in Tamil Nadu.

Step-by-Step Manufacturing Process

Step 1	Raw Material Preparation — Clarification and sterilization of molasses/maize-based substrate; pH and Brix adjustment
Step 2	Inoculum Development — Preparation of <i>Aspergillus niger</i> spore culture under controlled sterile conditions
Step 3	Submerged Fermentation — Aerated, temperature-controlled bioreactor operation over 5–7 days; continuous pH monitoring
Step 4	Broth Filtration — Separation of fungal mycelium from citric acid-rich fermentation broth using filter press
Step 5	Precipitation & Recovery — Citric acid precipitation using calcium hydroxide; conversion to calcium citrate cake
Step 6	Acidulation — Reaction with sulfuric acid to release free citric acid; removal of calcium sulfate (gypsum)
Step 7	Purification — Multi-stage activated carbon treatment, ion exchange decolorization, and deionized water washing

Step 8	Crystallization & Drying — Evaporative crystallization; centrifugal separation and fluidized bed drying
Step 9	Packaging & QA — Automated sieving, grading, and packaging under GMP-compliant conditions; quality testing

11. Financial & Market Analysis

Investment Overview

Land & Infrastructure: Site development, civil construction, access roads

Plant & Machinery: Bioreactors, filter press, crystallizers, dryers

Utility Systems: Steam, power, cooling water, compressed air systems

Effluent Treatment: Wastewater plant, environment compliance setup

Working Capital: Raw materials, packaging, receivables buffer

Financial Performance Indicators

Internal Rate of Return (IRR): Attractive — above industrial benchmarks

Payback Period: Favorable — within standard industrial investment norms

Break-Even: Achieved at moderate capacity utilization

Market Demand & Growth Drivers

India's citric acid market is experiencing sustained expansion, driven by:

- Rapid expansion of processed and packaged food industries
- Growing pharmaceutical excipient and nutraceutical demand
- Rising adoption of eco-friendly, biodegradable cleaning agents
- Increasing use in cosmetics and personal care formulations
- Export demand from Asia, Middle East, and Africa

India currently imports a

significant share of its citric acid requirements, creating a compelling import substitution opportunity for domestic manufacturers.

Global citric acid consumption trends are shifting toward natural fermentation-based organic acids — placing Indian manufacturers in a strong competitive position for both domestic sales and export.

12. Results & Business Outcomes

The NPCS engagement delivered measurable, strategic value to Indian Potash Ltd across multiple dimensions:

<p>✓ Entry into Specialty Chemicals Successful identification and validation of a high-demand manufacturing segment with strong growth fundamentals.</p>	<p>✓ Informed Investment Decision Comprehensive, data-driven project analysis enabled the leadership team to commit capital with confidence.</p>
<p>✓ Diversified Revenue Streams Reduced business concentration risk through entry into a new, high-margin product category.</p>	<p>✓ Import Substitution Positioning Strategic positioning to capture domestic demand currently met by imports from China and Europe.</p>
<p>✓ Scalable Manufacturing Model Fermentation-based production technology supports capacity scale-up with proven process economics.</p>	<p>✓ Export Market Access Identified export channels in Asian, Middle Eastern, and African markets for long-term revenue growth.</p>
<p>✓ Sustainability Alignment Manufacturing process aligned with green chemistry principles — waste valorization and by-product recovery opportunities identified.</p>	<p>✓ Full Implementation Readiness NPCS DPR serves as a comprehensive blueprint for plant setup, regulatory approvals, and project financing.</p>

13. Client Testimonial



NPCS provided us with a comprehensive and professionally structured project report for the proposed Citric Acid Manufacturing Unit. The feasibility insights, cost estimations, and market analysis enabled us to make an informed investment decision. We appreciate the depth of technical and financial evaluation delivered by the NPCS team and look forward to implementing the project as per their recommendations.

— M/s. Indian Potash Ltd | Coimbatore, Tamil Nadu

14. Why Choose NPCS?

NPCS stands apart as a consultancy partner through its combination of deep industrial expertise, data-driven methodology, and unwavering commitment to client success:

<p>Proven Industrial Expertise 40+ years of sector-specific knowledge across chemicals, food processing, pharmaceuticals, agro-industries, and manufacturing.</p> <p>Data-Driven Feasibility Every recommendation is backed by quantitative analysis — not assumptions — ensuring clients invest with full visibility.</p>	<p>Global Market Intelligence Research coverage spanning 50+ countries with access to real-time market demand, pricing, and trade flow data.</p> <p>End-to-End Project Support From opportunity identification to implementation planning, NPCS accompanies clients at every step of the journey.</p>
<p>Risk Mitigation Focus Proactive identification of technical, financial, regulatory, and supply chain risks — with actionable mitigation strategies.</p>	<p>Bankable DPR Quality Project reports prepared to international standards — suitable for bank financing, investor presentations, and regulatory submissions.</p>

15. Conclusion

The collaboration between NPCS and M/s. Indian Potash Ltd exemplifies how structured techno-economic advisory can transform investment intent into execution-ready strategy. By combining deep industrial knowledge with rigorous financial modeling and location-specific market intelligence, NPCS enabled the client to move from investment consideration to implementation approval with full confidence.

The Citric Acid Manufacturing Unit — strategically located in Coimbatore, Tamil Nadu — is poised to capitalize on growing domestic demand, import substitution opportunities, and expanding export markets. The project represents not just a diversification of Indian Potash Ltd's portfolio, but a long-term industrial asset built on solid technical and financial foundations.

NPCS remains committed to supporting its clients through the implementation phase and beyond, offering advisory services that evolve with the project lifecycle — from greenfield setup to operational scale-up.

READY TO BUILD YOUR NEXT INDUSTRIAL PROJECT?

Partner with Niir Project Consultancy Services (NPCS) to transform your investment idea into a profitable industrial venture.

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