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Red Gold Opportunities: Feasibility of Tomato Juice Production and Commercialization for a Sustainable Agricultural Value Chain in Solano, Nueva Vizcaya

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ABSTRACT

This study examined the feasibility of establishing Red Gold Opportunities, an all-natural, preservative-free tomato juice processing enterprise in Solano, Nueva Vizcaya. It addressed post-harvest losses, unstable farm-gate prices, and the absence of local processing facilities that could add value to locally produced tomatoes. The study used a quantitative-descriptive feasibility approach, combining a consumer sensory evaluation of 30 purposively selected respondents, technical process and facility design, financial projections, and legal and operational assessment. Results showed strong market acceptance, with an overall sensory rating of 4.43 out of 5.00 and 90% purchase intention. The preferred price for a 250 ml bottle was ₱48. The proposed system uses High-Temperature Short-Time pasteurization at a capacity of 500 kg per hour and requires approximately 28.24 metric tons of tomatoes annually. Financial projections indicated a total capital requirement of ₱5.02 million, a net present value of ₱11.85 million, an internal rate of return of 53.8%, a break-even point of 90,909 units, and a payback period of 3.12 years. The project is also expected to generate 11–14 direct jobs and improve farmer income through planned contract farming arrangements. Overall, the findings support the feasibility of Red Gold Opportunities as a local value-adding agribusiness that can reduce waste, strengthen farmer market access, and contribute to a sustainable agricultural value chain.

Keywords: *Tomato juice, feasibility study, agricultural value chain, value addition, agribusiness, Solano, Nueva Vizcaya*

INTRODUCTION

Solano, Nueva Vizcaya is a productive tomato-growing area, yet local farmers remain vulnerable to oversupply, unstable farm-gate prices, and post-harvest losses. Fresh tomatoes are highly perishable, and the absence of a nearby processing enterprise limits opportunities for value addition and leaves growers dependent on fluctuating commodity markets. This situation weakens income retention and constrains local enterprise and employment generation.

In response, this study proposes Red Gold Opportunities, a tomato juice processing enterprise that will use locally sourced tomatoes to produce an all-natural, preservative-free beverage. The project is intended to combine commercial viability with agricultural value addition by reducing waste, creating a more stable market for tomatoes, and supporting farmer livelihoods.

Specifically, the study assessed: (1) market viability through consumer sensory evaluation, purchase intention, and price tolerance; (2) technical feasibility through production process, equipment, capacity, and facility requirements; (3) financial feasibility through capital requirement, net present value, internal rate of return, break-even point, and payback period; and (4) the project's potential socio-economic contribution through employment generation and farmer income enhancement.

METHODS

A quantitative-descriptive feasibility approach was employed. The study assessed market feasibility through a Consumer Sensory Evaluation Questionnaire administered to 30 purposively selected adult consumers from Solano and nearby areas in Nueva Vizcaya. Respondents evaluated color, taste, sweetness, acidity, and saltiness using a five-point scale and indicated purchase intention, preferred pricing, and willingness to support locally produced products. The study used frequency distribution, weighted mean, and ranking to summarize the responses.

Technical feasibility was assessed through process flow mapping, equipment selection, facility layout planning, projected production requirements, utility needs, and review of food safety and compliance requirements. The proposed process includes raw material receiving and inspection, washing and sanitization, crushing, hot break treatment, pulping and juice extraction, formulation and blending, deceleration, HTST pasteurization, hot filling and capping, cooling, and labeling.

Financial feasibility was evaluated using estimated fixed assets, pre-operating expenses, working capital, operating costs, projected revenues, and five-year financial projections. We used net present value, internal rate of return, break-even point, and payback period as investment indicators. Legal and operational feasibility covered business registration, food safety and licensing requirements, staffing, standard operating procedures, and contract farming arrangements for tomato sourcing.

RESULTS AND DISCUSSION

Table 1

Summary of Key Market Findings

Indicator	**Result**
Respondents	30 consumers
Overall sensory rating	4.43 / 5.00
Color intensity	4.50
Taste pleasantness	4.40
Sweetness appropriateness	4.20
Acidity/freshness	4.35

Purchase intention	90%
Preferred price, 250 ml	₱48
Buy-local preference	82%
Willingness to support farmers	78%

The proposed product received favorable consumer feedback. The overall sensory rating of 4.43 indicated strong acceptance, while 90% of respondents expressed willingness to purchase the product. The preferred price of ₱ 48 for a 250 ml bottle provides a basis for initial pricing. Respondents also showed positive attitudes toward locally produced products and products that support farming communities. Suggestions on sweetness and acidity provided direction for further refinement of the product formulation. These results indicate a viable initial market base, although the small purposive sample limits generalization to the wider consumer population.

Table 2
Technical Feasibility Assessment

Component	Specification	Assessment
Processing method	HTST pasteurization, 95°C for 30 seconds	Technically suitable
Processing capacity	500 kg/hr	Meets intended scale
Raw material requirement	28.24 metric tons annually	Attainable with planned sourcing
Facility layout	Linear flow, about 2,100 m²	Operationally efficient
Critical control point	HTST temperature-time control	HACCP-aligned
Utility support	Water, electricity, generator, boiler fuel	Manageable requirements

The technical analysis shows that the proposed enterprise can be implemented using a structured small-to-medium-scale production system. HTST pasteurization was identified as the central processing technology because it supports product safety and stability. The proposed linear process flow and defined critical control points provide a practical basis for quality management. Required utilities and equipment must nevertheless be validated through site-specific engineering, pilot production, and regulatory review before commercial operation.

Table 3
Financial Feasibility Summary

Indicator	Result	Interpretation
Total capital requirement	₱5,020,000	Start-up investment
Net present value	₱11,850,000	Positive value creation
Internal rate of return	53.8%	Above 12% hurdle rate
Break-even point	90,909 units	Projected early in Year 2
Payback period	3.12 years	Within planning horizon
Year 1 net income	(₱360,000)	Expected start-up deficit
Year 2 net income	₱1,060,500	Profitability begins

Financial projections indicate favorable long-term investment potential. Although a start-up deficit is projected in the first year, profitability is expected to begin in the second year as sales volume increases and fixed costs are distributed more efficiently. The positive NPV, 53.8% IRR, projected break-even volume, and 3.12-year payback period support financial feasibility under the assumptions used. Because these figures are projection-based, actual performance will depend on realized sales, input prices, production efficiency, and financing conditions.

Table 4
Key Risks and Proposed Mitigation Measures

Risk Area	Identified Risk	Proposed Mitigation
Market	Competition and slow demand growth	Local branding, flexible pricing, market monitoring
Technical	Equipment malfunction, power interruption	Preventive maintenance, backup generator
Financial	Input inflation, working capital shortfall	Supply agreements, cost control, credit planning
Operational	Staff turnover, process inconsistency	SOPs, training, documentation
Supply	Tomato sourcing disruption	Contract farming, buffer inventory, farmer coordination

The identified risks are manageable but require early controls. Product differentiation, preventive maintenance, supply agreements, staff training, and financial monitoring are important during the start-up period. A formal contract farming arrangement can improve supply stability while providing participating growers with a more predictable market.

CONCLUSIONS AND RECOMMENDATIONS

The study concludes that establishing Red Gold Opportunities, a tomato juice processing enterprise in Solano, Nueva Vizcaya, is feasible and shows strong potential as a sustainable agribusiness venture. The proposed enterprise addresses existing challenges faced by local tomato farmers, particularly post-harvest losses, unstable farm-gate prices, oversupply during peak harvest periods, and the absence of nearby processing facilities that can add value to locally produced tomatoes.

The market assessment showed strong consumer acceptance of the proposed all-natural tomato juice, with an average sensory evaluation rating of 4.43 out of 5. About 90% of respondents said they were willing to buy the product, and ₱48.00 per 250 ml bottle was the most acceptable price. These findings indicate potential consumer demand and support the proposed product's market viability.

The technical assessment further showed that the proposed production system is practical and suitable for tomato juice processing. The utilization of High-Temperature Short-Time (HTST) pasteurization and the proposed processing capacity of 500 kilograms per hour provide a feasible production framework while supporting compliance with food safety and quality requirements.

Financial analysis also demonstrated the economic viability of the proposed enterprise. With an estimated initial investment of ₱5.02 million, the project generated a positive net present value of ₱11.85 million and an internal rate of return of 53.8%. The projected break-even point of 90,909 units and estimated payback period of approximately 3.12 years further indicate that the enterprise can recover its investment within a reasonable period and generate favorable financial returns.

Beyond its commercial potential, Red Gold Opportunities is expected to contribute to the socio-economic development of Solano, Nueva Vizcaya. The proposed enterprise may create employment opportunities, provide a more stable market for locally produced tomatoes, and improve farmer income through a contract farming arrangement that offers a 25% premium above prevailing farm-gate prices. By promoting local processing and agricultural value addition, the project can help reduce waste, strengthen market linkages, and improve the overall profitability and sustainability of tomato production.

Overall, the findings indicate that Red Gold Opportunities can serve as both a financially viable enterprise and a local development initiative. Establishing a tomato juice processing facility may strengthen the agricultural value chain, promote sustainable agribusiness, and contribute to the economic well-being of farmers and the broader community in Solano, Nueva Vizcaya.

Recommendations

Based on the study's findings and conclusions, the researchers recommend that the proposed establishment of Red Gold Opportunities be considered for implementation, subject to compliance with all applicable legal, regulatory, food safety, and business registration requirements.

The enterprise should conduct broader market validation with a larger, more diverse group of consumers before full-scale commercial operation. Additional market studies may also examine consumer preferences regarding product flavor, packaging design, bottle size, branding, and distribution channels to strengthen the product's market positioning.

The proposed business should establish strong partnerships with local tomato farmers through structured contract farming. Providing a stable market and offering a fair purchasing price, including the proposed 25% premium above prevailing farm-gate prices, may encourage consistent supply, improve farmer income, and strengthen long-term relationships between producers and the processing enterprise.

The management should strictly implement food safety and quality control measures throughout the production process. The enterprise should regularly monitor raw materials, processing procedures, sanitation practices, packaging, storage, and product quality to ensure consumer safety and compliance with applicable standards.

To strengthen the enterprise's financial sustainability, management should continuously monitor production costs, sales performance, pricing strategies, and market conditions. Management should also implement appropriate inventory management and production planning to minimize waste and ensure efficient use of tomatoes and other production inputs.

Local government units, agricultural agencies, and other development stakeholders may consider supporting similar value-adding initiatives through technical assistance, farmer training, market linkage programs, and access to appropriate financing. Such support may help develop sustainable local agribusiness enterprises and reduce farmers' vulnerability to fluctuating commodity prices.

Finally, future researchers may conduct further studies on the long-term operational performance, environmental impact, consumer behavior, supply chain management, and scalability of tomato processing enterprises. Comparative studies involving other tomato-based products may also be undertaken to identify additional opportunities for agricultural value addition and rural enterprise development.

AI DECLARATION STATEMENT

AI-supported tools helped with grammar and structure in creating this article. No AI tools were used to collect, analyze, or interpret data; all authors are credited for their academic contributions.

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