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Social return on investment of cultivating premium organic cherry tomatoes in Ubon Ratchathani Province, Thailand

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Abstract

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The cultivation of organic cherry tomatoes in greenhouses is being promoted by the government as a new cash crop for farmers. Analyses of the return on investment (ROI) for organic cherry tomato production are relatively extensive. However, there is still a lack of SROI analyses to provide comprehensive information for informed decision-making. The study investigated the cost-benefit analysis and social return on investment (SROI) of cultivating high-quality organic cherry tomatoes using substrate culture in greenhouses located in Ubon Ratchathani Province, Thailand. Cherry tomato cultivation costs were primarily driven by planting materials, greenhouse depreciation, and plant protection (21.29%, 20.53%, and 16.85%, respectively). Expanding the analysis to consider the impact on all stakeholders revealed positive effects on the economy, society, and the environment. This resulted in a significantly higher net present value (€1178.51) and internal rate of return (28.34%). The payback period was short (1 year and 11 months), and the SROI ratio was favorable (1.42). By considering both financial and non-financial indicators, this study concludes that cultivating high-quality organic cherry tomatoes in greenhouses is not only economically viable but also promotes social and environmental well-being. Therefore, promoting this practice for wider adoption among Thai growers is highly recommended.

Keywords: Cost-Benefit Analysis; Social Return on Investment; Organic Cherry Tomatoes; Substrate culture

Introduction

Cost-benefit analysis (CBA) is an important tool for evaluating economic efficiency according to traditional financial concepts (European Commission, 2015). However, solely focusing on financial analysis may not be sufficient in today's business environment (Hoogmartens et al., 2014). Businesses now consider the impact on external individuals, communities, society, and the environment based on the principles of sustainable development goals (SDGs). The importance of social and environmental perspectives has been increasingly emphasized in social accounting (Dunn, 2012), leading to a focus on production efficiency and quality of life improvement in current business practices (The Stock Exchange of Thailand, 2023). According to Vardakoulias (2013), economic performance measurement remains the most important, followed by social and environmental aspects. Cost-benefit analysis is an important concept that has gained popularity until now, but limited financial performance measurement has led to the development of new

indicators that measure benefits in other non-financial dimensions. Hence, social return on investment (SROI) has become a new indicator that has been increasingly discussed because it emphasizes measuring project results in social and environmental dimensions. In order to observe the changes that occur after the activity, such as improving living conditions, better health, and a better environment, to reflect the true value of future projects, as stated by Nicholls et al. (2012). Therefore, these evaluating performance from all aspects will improve performance measurement efficiency, in line with the concept of corporate social responsibility (CSR) that believes creating shared value (CSV) for society will lead to sustainable development in future.

Therefore, applying accounting concepts for social purposes to evaluate projects will result in a more comprehensive and efficient operation. This study compares project performance through various measurement tools to demonstrate the methods of calculating tangible returns and policy recommendations for maximizing benefits to entrepreneurs, relevant agencies, and interested parties.

Currently, the use of chemicals in vegetables has become a significant health concern that cannot be avoided, and the trend of using agricultural poisons to control pests is continuously increasing. Therefore, emphasizing the importance of safe agriculture production, such as organic farming, has become a crucial way out for related agencies to promote income generation, provide good health for the people, and create sustainability for the environment, communities, and society in the future. Cherry tomatoes are fresh fruit-consuming plants that have received continuous attention from consumers. Thus, promoting cherry tomato cultivation has become widespread and necessary, and consumers should choose tomatoes that are safe from chemicals (Royal Project Foundation, 2019).

Thailand has continuously increased the area of cherry tomato cultivation, with more than 24.406 acre or a total production of 134.084 t in the year 2021 (Office of Agricultural Economics, 2021). In the Northeastern region, it is a major cherry tomato producing area in the country, with an area of over 19.728 acres and a production volume of more than 71.794 tons (Office of Agricultural Economics, 2020), it is crucial for growers to have knowledge in production management to develop a standardized process for organic tomato production and prevent chemical contamination. This includes selecting varieties, cultivation, development of production processes, as well as efficient greenhouse management. The promotion of high-quality organic cherry tomato production technology in the greenhouse of growers in Ubon Ratchathani province, Thailand is a pilot project aimed to increasing growers' income. Growers have appropriate technical knowledge and are able to manage the greenhouse to control production efficiency (Modnok et al., 2022; Maneechoti & Athinuwat, 2019).

Therefore, this study focuses on evaluating the project's performance using economic cost-benefit analysis, coupled with assessing the social return on investment to ensure the project's effectiveness and alignment with decision-making. A social return on investment (SROI) is a technique for measuring the social, economic, and environmental value created by social enterprises. This goes beyond just financial gain (Millar & Hall, 2013). Although SROI is a multidimensional indicator, due to its complex measurement process and lack of widely accepted standards or practices such as accounting standards, there are still limitations and controversies in its calculation.

Social Return on Investment (SROI) evaluation is aimed at measuring the returns from carrying out operations in all dimensions, such as increased income, improved knowledge of the population, and better air quality, among others. The returns obtained will be used to add value throughout the impact value chain, in accordance with the Theory of Change, to measure whether activities and the resulting outputs are aligned with the objectives of the project. The financial measurement representative used must have clear assumptions and high caution, and SROI evaluation may vary depending on the area and context of the business. (Nicholls et al., 2012). Additionally, SROI evaluation emphasizes the measurement, analysis, and calculation of value based on information related to social impact (Basset, 2023), aligning with the principles of Corporate Social Responsibility (CSR). Furthermore, giving importance to various stakeholders will make the business meet society's expectations, and these mechanisms will enable the business to sustain itself. Therefore, SROI calculation is an accurate, complete, and realistic evaluation of operations going forward (Nicholls, 2009), social return on investment (SROI) due to the potential of such approach regarding the quantification of social impact.

Therefore, this study presents the results from the analysis of costs and returns using three methods, namely NPV, IRR, and Payback, to deeply discuss the financial implications. These tools are presented as options for evaluating the performance of the project, which align with sustainable decision-making and development.

Materials and Methods

This research study selected a purposive sampling method by choosing growers who participated in a project to cultivate high-quality organic cherry tomatoes in Ubon Ratchathani Province, Thailand, totaling 17 growers.

The method of growing high-quality cherry tomatoes is substrate culture. This method can reduce the risk of soil-borne diseases by up to 30% (Promchot et al., 2022). In substrate culture, the containers are made up of 8x16 inch baskets and a soil substitute material consisting of cassava residue mixed with organic compost. One cherry tomato plant was grown in each basket. Growing in baskets is believed to control the quality of the soil substitute material, reduce contamination and the risk of soil-borne diseases that arise from the use of reused soil (Resh, 2013).

For evaluating production costs, cost-benefit analysis and social return on investment, a semi-structured questionnaire was used, which was developed from literature review and survey of opinions from growers, group leaders, and related agencies. Important data were collected by targeting key informants, including the 17 growers of the organic farming group who could provide comprehensive information on production costs, income, problems, and other related returns according to the research topic. The interviews revealed information about the project operations of the growers and related agencies. In addition, the results of analyzing the social return on investment ratio were used to determine the value of every invested and which results could lead to income generation.

Data analysis consists of general information on production costs. This study focuses on comparing the production costs and returns of high-quality organic tomato production in greenhouses. The cost calculation in this study uses the concept of economic cost, which includes accounting costs or explicit costs and implicit costs. The total cost data obtained from the calculation will have a higher value than the actual costs paid in that period (Fürtner et al., 2022). All costs are based on the following assumptions: 1) labor costs (whether self-employed or contracted labor) are calculated in monetary terms based on working hours, labor rates, and the number of people. 2) The cost of equipment and materials is calculated as if all production factors were purchased. 3) In the case of growers using their own land, the land used is calculated as a simulated rental cost from an external source (calculated from the opportunity cost of using the land). 4) The project duration is calculated for the entire 3-year period. 5) The income rate from sales is calculated based on the proportion of current sales.

Cost-benefit analysis

An economical evaluation of costs involves collecting all production costs from the past, comparing them to the revenue generated, and determining the return on investment from operations. To calculate the return on investment, cost-benefit analysis is used, which includes net present value (NPV), internal rate of return (IRR), and payback period (PP).

Net Present Value (NPV) is used to measure the net present value of all investment, which calculates the present value of future benefits (cash inflows from economic, social and environment in the future) minus the present value of project expenses. If the result is positive, it indicates that the investment is worthwhile. The formula for calculating the net present value is as follows:

$$NPV = \sum_{t=1}^{m} \frac{Bt}{(1+r)t} - \sum_{t=1}^{m} \frac{Ct}{(1+r)t}$$

where:
NPV = Net present value;
B_t = Value of benefit in year, t;
C_t = Value of cost in year, t;
r = Discount rate;
t = Year of the project i.e. year 0, 1, 2...n
where n is the age of the project
m = Age of the project from the initial investment.

Internal Rate of Return (IRR) is the actual rate of return that calculates the discount rate that makes the NPV of the project equal to zero. It shows whether the annual return on investment is efficient enough to compensate for the investment cost. The formula for calculating the IRR is as follows:

$$\sum_{t=1}^{m} \frac{Bt - Ct}{(1+r)t} = 0$$

where
r = Internal rate of return (IRR);
Ct = Cost of the project in year, t;
Co = Cost of the project in year, t;
Bt = Net benefit in year, t;
t = Year of the project i.e. year 0,1,2...n;
m = Age of the project from the initial investment.

In considering any project, it will be accepted only if the internal rate of return (IRR) is higher than the total rate of return on investment.

Discount Payback Period (DPP) considers the time period needed to recoup the total investment amount by calculating the present value of cash flows from various benefits. (Drèze & Stern, 1987).

$$\text{Discount Payback Period (Years)} = \frac{\text{(Investment required)}}{\text{(Annual net cash flow)}}$$

In considering the selection of a project, the Payback Period (PP) will be evaluated from the shortest payback period (Garrison et al., 2010).

Social return on investment (SROI)

Social Return on Investment (SROI) assessment may vary depending on the area, population, society, and other related factors, in line with Rauscher et al. (2012) finding that social return evaluation follows the Result-Oriented principles in various processes, starting from input, activity/process, output, and outcome/impact, to determine how it affects the economy, community, society, and the environment. This study is based on the idea that organic farming provides benefits to other stakeholders or not, so it is essential to measure the accurate return on investment for all parties involved (Mitra et al., 2021). Therefore, giving importance to all stakeholders' gains and losses is a way to measure the accurate return on investment.

The social return on investment (SROI) analysis assesses returns from investments made in other areas such as the economy, society, and the environment, in financial terms. The following steps are taken:

- Identify the results of the changes that have occurred.
- Identify the stakeholders who benefit or are affected.
- Identify what will be used to measure or assess monetary value.
- Measure the cost and return on investment.

For truly evaluate the feasibility, based on realistic and rational assumptions about the costs and benefits derived from project participation. Once SROI has been calculated, we add the additional analysis about the concept of "Capital Budgeting" to determine whether the benefits of the business (economy, society, and the environment) justify the investment (Drèze & Stern, 1987). Therefore, SROI calculations involve detailed analysis, including the following factors:

$$\text{SROI} = \frac{\text{(Present value of all benefits)}}{\text{(Present value of all costs)}}$$

Results and Discussion

Cost of production

From the survey on the cost of production, it was found that the cost of cultivating high-quality organic cherry tomatoes can be divided into direct material costs, direct labor cost and overhead costs (Table 1).

Direct material costs

Basket

High-quality organic cherry tomato production in greenhouses using substrate culture methods requires one basket per plant. The cost of one basket is 0.30 €, and it has a lifespan of 3 years, resulting in a cost of 0.10 € per year for each production cycle. For a large greenhouse with approximately 180 seedlings, the cost of baskets is approximately 18.11 € per greenhouse.

Seed

Cherry tomato growers cultivate various tomato varieties using F1 hybrid seeds such as Solarino and Ubon Sweet, and other varieties. They do this to achieve specific characteristics, taste, texture, and color according to customer demand. The average seed cost per production cycle is 43.27 €.

Planting materials

Since the soil in Ubon Ratchathani province is low in fertility, in order to produce high-quality organic cherry tomatoes, most growers use organic fertilizers and biofertilizers to improve soil quality before planting. The cost ranges from 12.58 to 75.47 €. The organic fertilizers commonly used are organic fertilizer, fish biofertilizer, and fruit biofertilizer, and the average amount used is 10 kg per plant. However, the

Table 1. Benefits and costs of organic cherry tomato production

Items	Cost Type	Substrate culture	
		Amount	%
Direct Material Cost			
Basket (€)	Variable	18.11	1.77
Seed (€)	Variable	43.27	4.24
Planting materials and Bio extract (€)	Variable	217.36	21.29
Biological control agent cost (€)	Variable	75.47	7.39
Total direct material cost (€)		354.21	34.69
Direct Labor Cost			
Land preparation (€)	Variable	15.09	1.48
Planting (€)	Variable	5.03	0.49
Plant protection (€)	Variable	172.08	16.85
Harvest wages (€)	Variable	86.04	8.43
Total direct labor cost (€)		278.24	27.25
Overhead Cost			
Electricity (€)	Variable	10.21	1.00
Transportation (€)	Variable	40.75	3.99
Packaging (€)	Variable	73.96	7.24
Rental fee (€)	Fixed	12.58	1.23
Depreciation-Greenhouse (€)	Fixed	209.64	20.53
Depreciation- Water System (€)	Fixed	41.33	4.05
Total Overhead Cost		388.49	38.05
Total cost of production (€)		1020.94	100.00
Average yield, kg		296	
Production cost per kg (€)		3.45	
Selling price per kg (€)		5.03-6.29	
Profit per kg (€)		1.58-2.84	

amount of fertilizer used may vary depending on the size of the area, soil quality, and desired crop quality. Therefore, if the greenhouse size is 200 m^2, the cost of organic fertilizer to improve soil quality is approximately 125.78 €, but if grown in baskets, the cost of the planting materials is 91.57 €, or a total of 217.36 €.

Biological control

Microbial pesticides commonly used by growers include *Trichoderma harzianum*, *Metarhizium anisopliae*, *Bacillus thuringiensis* (Bt), and *Bacillus weihenstephanensis*. A survey found that for a large greenhouse of approximately 200 m^2, the cost of biological products is approximately 75.47 €. For planting one tomato plant, approximately 10 l of biological products are used, which is equivalent to a percentage of 5–6% of the total cost.

Direct labor costs

Direct labor costs include the cost of labor for land preparation, planting, maintenance, and harvesting. A survey found that growers use two types of labor: personal labor from family members and hired labor from external individuals. Growers use their own labor for 94.12%, while the remaining labor is hired. To calculate the labor cost of themselves and their family members, the minimum wage rate of 7.55 € per day (8 h) per 200 m^2 is used. Therefore, the details of each type of labor cost are as follows in Table 1.

Overhead cost

Other production costs include expenses such as electricity, transportation and packaging costs. Based on the survey, most growers use their own land to build greenhouses. Therefore, in calculating the cost, the "opportunity cost" concept is used, which means calculating the benefits obtained from renting out the land to other agricultural purposes (Ivanova, 2023). The average rental cost for land used to build greenhouses is 12.58 € per greenhouse per production cycle.

Depreciation costs of buildings and agricultural equipment

Since the construction cost of buildings and agricultural equipment is considered as "assets" or capital expenditures, according to accounting Standard No.16 regarding land, buildings, and equipment, businesses must share the depreciation of assets over the useful life, instead of recognizing all the costs at once (Thailand Federation of Accounting Professions, 2019).

Depreciation of greenhouse

From a survey of growers participating in the project, it was found that the greenhouse used for growing high-quality organic cherry tomatoes is about 200 sq.m. in size with a construction value of approximately 3018.87 €, consisting of netting and plastic cover valued at 503.14 € with a lifespan of 3 years, which results in a depreciation value of 167.71 €, and steel structure valued at 2515.72 € with a lifespan of 10 years, which results in a depreciation value of 251.57 € per year. The total depreciation value is 419.29 € per year or 209.64 € per production cycle of 180 days.

Depreciation of water system equipment

In order to produce high-quality cherry tomatoes, it is necessary to use water system equipment, including water pumps, hoses, drip irrigation systems, and water tanks, as well as related equipment with a total value of 248.05 € and a lifespan of 3 years, resulting in a depreciation value of 82.67 € per year. Since this production takes about 180 days, the total depreciation value of the water system equipment is 41.33 € per production cycle.

It was found that cherry tomato cultivation had production costs mostly comprised of material costs for planting, depreciation costs of the greenhouse, and labor costs for maintenance, calculated at 21.29%, 20.53%, and 16.85%, respectively.

Cost benefit analysis

Table 2 presented an analysis of the costs and returns of growers growing high-quality organic cherry tomatoes over a 3-year period. The risk ratio was determined based on a loan interest rate of 7% and the current inflation rate of 3.00% (Bank of Thailand, 2022). The results indicate a positive Net Present Value (NPV) of 102.72 € and an internal rate of return (IRR) of 9%. However, the payback period is 2 years and 6 months, and the return on financial investment ratio is only 0.66, suggesting that the project may not be particularly attractive to investors, despite the positive present value. Although the internal rate of return is higher than the cost of the loan, it is not significantly so. Moreover, the payback period of 2 years and 6 months means that the project is a long-term investment. Therefore, growers should consider expanding production or increasing the number of production cycles to further enhance the project's value.

Social impact evaluation

This study focuses on comparing traditional financial decision-making tools, the Return on investment (ROI) and the Social Return on Investment (SROI) metric, which emphasizes measuring non-financial benefits and costs. Because the ROI metric focuses only on financial aspects, While the SROI metric considers the environmental and social costs

Table 2. The results of the analysis of the high-quality organic tomato in a greenhouse

Items	Year			
	0	1	2	3
Cashflow (€)	0	1861.63	2052.64	2257.90
Outflow (€)	-3101.53	750.71	825.78	908.36
Net cash flow (€)	-3101.53	1110.91	1226.85	1349.53
Accumulated net cash flow (€)	-3101.53	-1990.61	-763.76	585.77
Net present value (NPV)	=	102.72		
Internal rate of return (IRR)	=	9%		
Payback period (PP)	=	2 years 6 months		
Return on investment (ROI)	=	0.66		

Note: The growth rate is calculated based on the annual interest rate of 7% of loans and the inflation rate of 3.00%, while the discount rate is calculated based on loan interest rates of 7%.

and benefits that may arise according to sustainable principles and the long-term risks of the project. However, both metrics still have uncertainties regarding accuracy and completeness of the evaluation.

Regarding the methodological aspects of SROI, it's important to highlight that the methodology for choosing financial outcomes and proxies is not yet fully standardized. This can lead to potential biases due to some level of subjectivity in the analysis (Basset & Giarè, 2021). Hence, this study employs risk and probability analysis in investment decision-making, using the Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period metrics (PP), to better comprehensively compare and explain the data for transparent and efficient financial analysis, as shown in Table 3.

Table 3. Social impact evaluation result from activities and stakeholders

Dimension	Stakeholders	Items/Metrics	Base Case Comparison	Amount (€)	ROI	SROI
Economic	Farmers	Incremental income from selling high-quality cherry tomatoes	–Income from increasing produce x average production x time per year	1861.64 (first year)	✓	✓
	Farmers	Saving on planting materials	– the cost of growing tomatoes that can be reduced	40.25		✓
	Community members	Farmers and community people who have jobs in the area do not have to travel to find work elsewhere	–Average reduction in gas per day (liters) × number of trips × number of working days	452.83		✓
Total economic benefits 2354.72 €						
Social	Farmers and families	Better health	– Medical expenses of farmers and family members that can be saved.	85.94		✓
	Farmers	– Farmers have more knowledge of the production process. – Expenses for training in agriculture	–Expenses for training in agriculture	25.16		✓
	Government agency	– Reduce the government aid budget by causing the government to prepare other projects In addition to generating income instead	– Budget for community development promotion	50.31		✓
	Community/ Public	– meet with consumers directly more market have regular customers	–advertising expenses (Online advertising costs)	176.10		✓
	Farmers in the community	– an exchange of knowledge within the group/a new source of learning in the community	– Economical travel expenses per person per year	25.16		✓
The total social benefits amount is 362.67 €						
Environment	Environment (Soil, water, air)	– reduce chemicals in soil, water and environment.	– The cost of soil adjustment that can be reduced	12.58		✓
		– Able to recycle plant matter to be useful, such as making compost / making fermented water	– Bio extract	18.11*		✓
The total environmental benefits amount is 86.04 €						

Note: *Biothai (2011)

Social return on investment (SROI)

SROI analysis can be carried out through several steps, including 1) Stakeholder Analysis, 2) Understand what changes, 3) Value the things that matter, 4) Indicator Development, 5) Base Case Scenario and do not over claim 6) Financial Proxy, and 7) SROI Calculation (The SROI network, 2012). These steps were conducted through a survey of basic information from the target group of growers using a semi-structured questionnaire developed from a literature review and survey review. Deep interview data collection from various stakeholders, including growers, government officers, and project officers, was also utilized.

It can be seen that the returns from producing high-quality organic cherry tomatoes consist of approximately 1861.64 € from selling the yield. In addition, the economic benefits include seed costs of 40.25 €, travel expenses (due to working on their own land) of 452.83 €, and social benefits such as improved health of growers and family members due to a reduction in chemical pesticide exposure of 85.94 €, an increase in agricultural knowledge of 25.16 €, and saving over 50.31€ in other government-promoted income-generating programs, as well as an increase in regular customers or customer recognition of 176.10 €, and environmental benefits such as improved soil quality valued at 12.58€ and the creation of organic plant compost valued at 18.11€. Therefore, from the benefits received in all dimensions above, it is clear that using the idea of social investment returns in calculations will reveal the benefits that growers will receive in the amount of 2,803.42 €, which is greater than the monetary benefits and is an important factor in creating sustainable development for future groups.

According to the results, the net present value (NPV) is positive, equal to 1178.51 €, indicating that it is an investment worth considering. The internal rate of return (IRR) is as high as 28.34%, and the payback period is only 1 year and 11 months. The social return on investment ratio is 1.42, indicating that for every invested in this project, the social, community, and environmental benefits are as high as 1.42 €. Therefore, when analyzed under the production cost and social return on investment, growers will find this project worthwhile as it yields high returns, covers costs, and can be paid back in only 1 year and 11 months (Table 4).

Discussions

Based on the cost-benefit analysis (CBA) study of the project's performance, it was discovered that ROI and SROI ratios provide different perspectives. Relying solely on financial analysis through ROI may result in errors in decision-making. However, both methods have their advantages and disadvantages. While ROI may have a narrower view, it is suitable for growers with limited capital. Considering financial ratios that reflect the liquidity of the business can help in planning and addressing liquidity problems in a timely manner. In addition, based on the Theory of Change and Stakeholder theory, SROI is considered a comprehensive tool for assessing social outcomes (Edwards & Lawrence, 2021). Therefore, expanding the measurement indicators to include dimensions of society, community, and the environment can reveal the true benefits in all dimensions, making it suitable for long-term non-financial outcome measurements. However, it's important to prioritize the collection of social and environmental outcome data for clear evaluation in the future. A data collection system should be set up that is comparable to other data sources or years that have not had projects or basic data to compare the results between groups who participated and did not participate in the project. This will

Table 4. The analysis of social returns on investment by applying the concept of cost-benefit analysis

Items	Year			
	0	1	**2**	3
Cash Flow from Operations (€)		1861.64	1921.77	1983.84
Cash Inflow (Economic) (€)		493.08	493.08	493.08
Cash Flow (Social) (€)		362.67	362.67	362.67
Cash In Flow (Environment) (€)		86.04	86.04	86.04
Total Cash Flows (€)		2803.42	2863.55	2925.63
Cash Outflow (€)	-3018.87	1230.59	1230.59	1230.59
Net Cash Flow (€)	-3018.87	1572.83	1632.96	1695.03
Net Present Value (NPV) (€) (Discount Rate 7%)	=	1178.51		
Internal Rate of Return (IRR)	=	28.34		
Net Present Value Payback Period (PB)	=	1 year 11 months		
SROI	=	1.42		

help in identifying how social change is obtained and what value is created.

Conclusion

The purpose of this study was to investigate the costs and returns from participating in a high-quality organic cherry tomato cultivation project in a greenhouse of growers in Ubon Ratchathani province, Thailand. The study found that the production costs, including planting materials, depreciation of the greenhouse, and labor costs, were the main components. The financial analysis revealed that the project was not very attractive for investment. However, when expanding the study to other dimensions related to other stakeholders, it was found that participating in the project had positive impacts on the economy, society, and the environment, leading to a higher net present value of 1178.51 € and a higher internal rate of return of 28.34%. The payback period for the project was also short, as it could be recovered within just 1 year and 11 months. Therefore, relying solely on financial indicators may not be sufficient in evaluating the project's success. Both financial and non-financial indicators should be considered to capture all benefits and ensure better long-term decision-making (Anastasova-Chopeva, 2019).

This research only collects data specifically from high-quality organic cherry tomato growers in the Ubon Ratchathani province area. Therefore, in the future, it should be expanded to other areas to confirm the study's results and explore other related topics such as consumer satisfaction, local communities, knowledge, and capabilities. Additionally, in the future, it should also study the development of efficient plant breeding, which is responsive to organic fertilizers, disease, and pest-resistant crops. Since growers are still not producing enough yield, future studies should focus on expanding research on other production methods, different greenhouse designs, suitable production quantities per greenhouse, or risk reduction strategies against pests and diseases to promote sustainable agricultural planning for growers.

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Conflict of interest

All authors have no conflicts of interest.

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