

# *Profitability Analysis:* **1-ha Organic Tomato Production**



**Philippine Council for Agriculture, Forestry and Natural Resources Research and Development**

Department of Science and Technology

*Providing science solutions for a vibrant agriculture and sustainable environment*

# About PCARRD

**T**he Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) is one of the sectoral councils under the Department of Science and Technology (DOST). Established in 1972, PCARRD formulates policies, plans, and programs for science and technology-based development in the agriculture, forestry, and natural resources (AFNR) sectors. It coordinates, evaluates, and monitors the national research and development (R&D) efforts in AFNR. It also allocates government and external funds for R&D and generates resources to support its programs.

The first DOST council to earn an ISO 9001:2000 certification for its quality management system, PCARRD is engaged in active partnerships with international, regional, and national organizations and funding institutions for joint R&D, human resource development and training, technical assistance, and exchange of scientists, information, and technologies.

The Council supports the National Agriculture and Resources Research and Development Network (NARRDN), composed of national multi- and single-commodity and regional R&D centers, cooperating stations, and specialized agencies. As such, PCARRD has been a potent arm in catalyzing the Philippine AFNR sectors toward self-sufficiency and global competitiveness.

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# **Profitability Analysis: 1-ha Organic Tomato Production**

**Philippine Council for Agriculture, Forestry and Natural Resources  
Research and Development (PCARRD)**  
Department of Science and Technology (DOST)

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## Message

I congratulate PCARRD-DOST for coming up with this Profitability Analysis, which is not just a publication, but more importantly, a science and technology (S&T)-based solution. PCARRD has put together the necessary information that would make agribusiness venture more technically and financially viable.

The tested package of technology (POT) that PCARRD and its research and development (R&D) partners have developed and included in this publication, together with the encouraging financial projections, highlights the role of S&T in achieving our national development goals.

I am optimistic that with the dissemination of the Profitability Analysis, which PCARRD has prepared for a significant number of priority commodities and products, our people will develop greater appreciation of S&T-based entrepreneurship in agriculture and natural resources sectors.

**Hon. ESTRELLA F. ALABASTRO**

Secretary

Department of Science and Technology

Republic of the Philippines

## Message

**A**gribusiness is among the flourishing enterprises in the country today. However, many of our people, particularly the small and medium entrepreneurs could not easily engage in agribusiness due to constraints in the establishment process.

This publication, the Profitability Analysis, is a very laudable initiative by PCARRD-DOST having put together a set of solutions addressing startup constraints. Specifically, this publication contains key technical and financial information necessary to start, operate, and profit from a science and technology (S&T)-based agribusiness enterprise.

I commend PCARRD for pursuing the development of this publication. This very important contribution will definitely help boost entrepreneurship, especially in the rural sector; create additional income and job opportunities; and promote the production of high quality agribusiness products.

**Cong. LUIS R. VILLAFUERTE**

Chair, Committee on Aquaculture and Fisheries  
Member, Committee on Science and Technology  
Member, Committee on Agriculture  
House of Representatives

## Foreword

This year, the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) offers a new technology publication that promises to be fully utilizable and handy.

The Profitability Analysis (PA) arose from our yearning to address your needs as small and micro entrepreneurs, farmers and growers. More than just a handout, this innovative package of information provides tools to help you gain and secure a niche in your business enterprise.

The PA series is based on our study of selected commodities. Here you will find the technical and financial data you will need to put up an agricultural enterprise. It presents analytical tools you can use in project planning and in predicting how the business would operate under a set of assumptions. Thus, it ensures that your projects are technically and economically feasible for implementation. Through the profitability analysis and other information, we at PCARRD, hope to contribute substantially in providing livelihood options for Filipinos, especially those in rural communities.

Specifically, this PA contains the projected income statement and cash flow for a 1-hectare organic tomato production. Also, it contains the recommended production system including information on varieties, soil type and site, best growing period, seedling production, land preparation, field planting, fertilization, water management, and weed, pest, and disease management. It also includes information about harvesting, postharvest handling, and marketing.

Feel free to use the information in these pages. Contact us for further information you may need or better yet, for any suggestions on how we can make this publication better. Together, we can improve the production system for organic tomato and seal its importance in our national economy.

**PATRICIO S. FAYLON**  
Executive Director



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# Introduction

Tomato is considered the most important vegetable in the world. In fact, it is planted to about 4.4 million ha around the world. In the Philippines, around 17,500 ha is grown to tomato with Pangasinan and Bukidnon as the top producing areas.

Tomato can be eaten fresh in salads, sauces, and sandwiches. It is also used to flavor soups, meat, and fish dishes. It can be made into candies, dried fruit, and wine. Various products can also be derived from processing tomato. These include purees, juice, ketchup, canned whole and diced. It is certainly a nutritious favorite among Filipinos.

Initial Capital	P519,534.00
Net Return/4-month cropping cycle	P1,182,225.00
Benefit-Cost Ratio (BCR)	6.43
Return on Investment (ROI)	228%
Payback Period	1 cropping cycle

Tomato's food and nutritional value, matched with its market potential, makes it a viable agribusiness option for small and medium entrepreneurs. And because it can be grown successfully under organic conditions, producing organic tomato is an even more viable investment opportunity. It inherits the food and nutritional value

of a typical tomato while also creating a profitable market niche of its own.

A 1-ha organic tomato production is a profitable investment requiring a total initial capital of P519,534. Estimated net return on a 4-month cropping cycle stands at P1,182,225, representing a large ROI of 228%. At this rate, the initial investment is recovered within just 1 cropping cycle.

Moreover, for every P1 cost incurred, the venture returns P6.43 to the investor.

The package of technology (POT) for organic tomato production is the recommended production technology of PCARRD's research and development network.



## Cost and return for organic tomato production.

Yield (kg/ha)	35,000
Price/kg	40

<b>Gross Return (GR)</b>	<b>1,400,000</b>
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Expenses	Qty	Unit	Unit Price	Total
<b>A. Direct Materials (DM)</b>				
Seeds	0.3	kg	1,950	585
Trellis - bamboo or ipil posts	3,000	pcs	10	30,000
GI wire #16	100	kg	52	5,200
Synthetic Straw	40	rolls	30	1,200
Net Bags	100	pcs	25	2,500
Biofertilizers				
Chicken Manure	15	ton	1,000	15,000
Carbonized Rice Hull	5	ton	500	2,500
Fermented Plant Juice (FPJ)				1,000
Fermented Fruit Juice (FFJ)				1,000
Compost, 1 ton	20	sacks	50	1,000
Bio-pesticides				
Bio-spray (commercial brand)				1,000
Planting Materials (aromatic plants, etc)	5	tons	200	1,000
<b>Sub-total</b>				<b>61,985</b>



## Cost and return... (continued).

<b>B. Direct Labor (DL)</b>	<b>Qty</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Total</b>
Seedbed Preparation and Care of Seedlings	12	md	220.00	2,640
Plowing	10	mad	440.00	4,400
Harrowing	8	mad	440.00	3,520
Furrowing	2	mad	440.00	880
Fertilization - basal	4	md	220.00	880
Transplanting	20	md	220.00	4,400
Fertilization - sidedress	16	md	220.00	3,520
Weeding	16	md	220.00	3,520
Cultivation	4	md	220.00	880
Trellising	20	md	220.00	4,400
Spraying	8	md	220.00	1,760
Irrigation	20	md	220.00	4,400
Vine Training	8	md	220.00	1,760
Roguing	4	md	220.00	880
Biofertilizer Preparation	6	md	220.00	1,320
Harvesting, hauling, sorting, and packing	60	md	220.00	13,200
<b>Sub-total</b>				<b>52,360</b>
<b>C. Other Expenses</b>	<b>Qty</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Total</b>
Transportation				10,000
Depreciation	4	months	6,808	27,232
Miscellaneous <sup>1</sup> , 10% of DM				6,199
Full-time laborers	2	persons	4,500	36,000
Land Rent, P6,000/month	4	months	6,000	24,000
<b>Sub-total</b>				<b>103,430</b>
<b>Total Expenses (TE) per 4-month cycle</b>				<b>217,775</b>
<b>Net Returns (NR) per 4-month cycle</b>				<b>1,182,225</b>
<b>Fixed Asset (FA) investment</b>				<b>328,990</b>
<b>Working Capital (WC)<sup>2</sup></b>				<b>190,544</b>
<b>Initial Investment (FA+WC)</b>				<b>519,534</b>
<b>Cost of Production per kg</b>				<b>6.22</b>
<b>Benefit-Cost Ratio (GR/TE)</b>				<b>6.43</b>
<b>Return on Investment (ROI), (NR/Initial Investment)</b>		<b>228%</b>		
<b>Payback Period (FA/NR)</b>		<b>1 cropping cycle</b>		

<sup>1</sup> Cost of production for hot pepper spray, tea manure, insect pollinators, etc

<sup>2</sup> Total cash required per cycle = TE - Depreciation

## Technical assumptions.

Production Cycle	4 months
Farm Size	1 ha
Farm Utilization	exclusive to organic tomato
Tomato Variety Used	salad type varieties (no significant differences in yield and farm gate prices)
Post-harvest Operations	only up to packing in recyclable plastic crates

## Financial assumptions.

Total Initial Investment	519,534, full equity
Depreciation Method	straight line, 0 salvage value
Marketable Yield	35,000 kg net of postharvest losses and rejects
Selling Price of Organic Tomato	P40/kg at farm gate
Marketing of Produce	picked up by bulk buyers
Labor Rate	P4,500/month
Land Rent	P6,000/month



## Investment on facilities, tools and equipment.

Facilities	Quantity	Unit Price	Cost
Irrigation System	1	120,000	120,000
- Water Pump, Couplers,			
- Sprinkler Head, PVC pipe			
Composting System			64,000
- Shredder (engine motor)	1		
- Drum composter (200-L capacity)	3		
Nursery (200 m <sup>2</sup> )			15,000
- Bamboo poles, frames, plastic			
- Roof, clear black net for shading			
Packing House (Shed Type)			20,000
- Bamboo tables, sink, and water source			
Tools and Equipment			
- Knapsack sprayer (16-L capacity)	2	1,900.00	3,800
- Scythe	5	140.00	700
- Hoe	5	400.00	2,000
- Shovel	3	200.00	600
- Rake	5	200.00	1,000
- Plastic drums (200-L capacity)	10	800.00	8,000
- Weighing scale (60-kg capacity)	1	1,290.00	1,290
- Knife	6	100.00	600
- Plastic crates	400	180.00	72,000
- Harvest cart - fabricated	2	10,000	20,000
<b>Total Investment on Facilities, Tools, and Equipment</b>			<b>328,990</b>

**Monthly depreciation (straight line method,  
zero salvage value).**

Facilities	Cost	Life Span	Dep.
- Irrigation system	120,000	5	2000
- Composting system	64,000	5	1067
- Nursery (200 m <sup>2</sup> )	15,000	2	625
- Packing house (shed type)	20,000	2	833
Tools and Equipment			
- Knapsack sprayer (16-L capacity)	3,800	2	158
- Scythe	700	2	29
- Hoe	2,000	2	83
- Shovel	600	2	25
- Rake	1,000	2	42
- Plastic drums (200-L capacity)	8,000	2	333
- Weighing scale (60-kg capacity)	1,290	2	54
- Knife	600	2	25
- Plastic crates	72,000	5	1200
- Harvest cart - fabricated	20,000	5	333
Total Depreciation Monthly			6808

**Nutritional content of tomato per 100g edible portion:**

Calcium	: 10 mg
Carbohydrates	: 3.6 mg
Fat	: 0.1 g
Iron	: 0.6 mg
Niacin	: 0.6 mg
Phosphorus	: 16 mg
Protein	: 1.0 g
Vit. A	: 1,700 IU
Vit. B1	: 0.1 mg
Vit. B2	: 0.02 mg
Vit. C	: 21 mg
Water	: 94 g



# Package of Technology

## **Commercial Varieties**

**Floradade,  
Monteverde,  
Mountain Fresh, and  
Walter F1**

- Salad type
- 150-250 g/fruit
- Thick flesh
- Moderately firm
- Flat round to high round
- Yield: 35 t/ha

## **Site**

- Has adequate supply of irrigation water
- With farm-to-market road
- Must be at least 1 km away from farms that use chemical fertilizer and pesticides

## **Soil Type**

- Sandy loam or clay loam
- Has good drainage
- pH 5.5–6.0

## **Best Growing Period**

- September to March in low-elevation areas
- Throughout the year in mid- and high-elevation areas

## **Seedling Production**

- Seed source : local seed companies or seed dealers
- Amount of seeds/ha : 200–300 g
- Number of plants/ha : 33,333

## **Soil Mixture**

- 2 parts garden soil
- 2 parts compost or fully decomposed chicken manure
- 1 part carbonized rice hull

### **Sowing**

- Soak seeds in tap water for 4 hours, then air dry
- Prepare five seedbeds; each bed measures 1 m x 10 m
- Incorporate 1 kg compost or fully decomposed chicken manure and 300 g carbonized rice hull
- Water the seedbeds and make shallow lines across the bed, 7cm–10 cm apart
- Line-sow 2 seeds every 3 cm, cover lightly with fine soil
- Mulch with rice hull or chopped rice straw
- Water again after mulching

### **Care and Maintenance**

- Provide partial shade during dry season and rain shelter during wet season
- Water regularly
- Fertilize with tea manure diluted with equal amount of water at 4 days after emergence and twice a week thereafter

### **Preparation of Tea Manure**

- Fill burlap sack with partially decomposed cow, carabao or horse manure
- Place sack of manure inside a plastic drum (200-L capacity); put weight
- Fill drum with water and cover with net or cloth
- Ferment for 1 week

### **Hardening**

- 1 week before transplanting, expose the seedlings fully to sunlight
- Water the seedbeds only when seedlings show temporary wilting

### **Land Preparation**

- One plowing and two harrowings
- Make furrows 1.0 m apart
- Incorporate 1 kg fully decomposed chicken manure and 500 g carbonized rice hull per linear meter

- Dig holes 0.40 m apart along the furrow
- Drench each hole with 0.5 L undiluted tea manure

### **Field Planting**

- Transplant seedlings at 3–4 weeks after emergence
- Water the seedbeds thoroughly and gently uproot the seedlings
- Plant one healthy seedling per hole
- Replant missing hills at once
- Provide trellis to prevent the plants from lodging

### **Fertilization**

#### **Basal application**

- Apply 1 kg fully decomposed chicken manure and ½ kg carbonized rice hull per linear meter and ½ L undiluted tea manure per hole

#### **Side dressing**

- Apply 500 g/linear meter fully decomposed chicken manure or compost during the 1st and 2nd hilling-up at 28 and 45 days after transplanting

#### **Supplements**

- Apply weekly as soil drench – tea manure diluted with water (1:1)
- As foliar spray – fermented plant juice at 1 tbsp/gal of water during the vegetative stage
- As foliar spray – fermented fruit juice at 1 tbsp/gal of water during flowering up to fruit setting

### **Preparation of Fermented**

#### **Plant Juice**

- Collect young leaves and shoots of legumes or other fast-growing plants
- Cut into small pieces and mix with crude sugar (3 kg plant parts : 1 kg sugar)
- Place the mixture in a net bag, put this inside the plastic pail, put weight, then cover with paper or cloth

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- Store mixture in a cool, dark place for 5–7 days
- Collect fermented juice, place in a glass container, and cover

### **Preparation of Fermented Fruit Juice**

- Chop ripe banana, papaya, and squash fruits
- Mix with crude sugar or molasses (3 kg chopped fruits: 1 kg sugar)
- Pour mixture in a net bag, place in a plastic pail, put weight, then cover with paper or cloth
- Store the mixture in a cool, dark place for 5–7 days
- Collect the fermented juice, pour inside a glass container, and cover with paper or cloth

### **Weeding and Cultivation**

- Cultivate by off-barring at 14 days after transplanting
- Hill-up at 28 and 45 days after transplanting
- Spot weed as needed
- Apply mulch after planting to control weeds

### **Water Management**

- Irrigate before and after transplanting
- Irrigate weekly if necessary
- Apply mulch to conserve moisture

### **Insect Pest and Disease Management**

#### **Major Insect Pests**

*Tomato hornworm*

- Control
  - Hand pick hornworm
  - Plant repellent crops like marigold and opal basil around and along the rows
  - Plant dill as trap crop
  - Spray hot pepper solution (100g macerated hot pepper + 1 tbsp soap/16 L water)

### *Tomato Fruitworm*

- Control
  - Spray the plant with water in the morning to attract ladybug. It eats 60-fruitworm eggs/day.
  - Use garlic and onion spray to repel fruitworm
  - Spray with hot pepper solution

### **Diseases**

#### *Mosaic*

- Control
  - Rouging
  - Plant barrier crops
  - Spray with lactic acid bacteria serum (LABS) to increase plant resistance

### **Preparation of Compost Tea**

- Place ripe compost in a cloth bag
- Put the compost tea bag in a glass jar
- Pour water inside jar and let stand overnight

### **Preparation of LABS**

- Pour new rice washing in a glass jar
- Let it stand for 20 minutes to collect lactic acid bacteria from the air. Cover the jar with paper
- Store the jar in a cool dark place for 1 week
- Strain the fermented solution and set aside
- Prepare milk solution by placing and mixing 1 tbsp powdered milk in a glass of water. Add 1 part fermented rice washing to 10 parts milk solution.
- Cover glass jar with paper and store for a week
- Remove the scum on top of the solution
- Strain the fermented milk solution or the pure culture LABS.

## Postharvest

### Handling/Packaging

- Harvesting could be done continuously for 1 month or more depending on variety and cultural practices
- Harvest tomato fruits at mature green and breaker stages
- Harvest early in the morning, 2-3 times a week
- Classify fruits according to market standards
- Pack in plastic crates

## Marketing

### *Before planting*

- Arrange contract growing agreements with institutional buyers such as fastfood centers, hotels, restaurants, airline companies\*
- Check the requirements of special markets, weekend markets, farms stands, and supermarkets
- Organize consumer groups\*\*

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\* Institutional buyers have specific requirements for volume, quality, and dependability of supply

\*\* Consumer groups are composed of individuals who are health conscious, prefers environment-friendly food products, knowledgeable about the benefits of organically grown products, and can afford the premium price of organic food products.

## **Credits**

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