

OFF-SEASON TOMATO PRODUCTION TECHNOLOGY

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Introduction

In the Ilocos Region, tomato is one of the major cash crops normally cultivated by farmers during the DS after rice is harvested. Planting season is from November to December and the bulk of the produce is harvested in February and March. Thus, the local market during this period is generally flooded with locally produced fresh market tomato. Naturally, the price becomes very low, averaging less than ₱ 5 kg⁻¹. Worse, the supply is much higher than the demand for the product, resulting in a host of marketing problems.

With the development of the three tomato hybrids, MMSU Hybrid 1, MMSU Hybrid 2 and MMSU Hybrid 3, Ilocos farmers can now venture in tomato production during the off-season. To maximize the full potentials of the selected hybrids, accompanying production technology was also developed. Several conventional techniques of tomato production were modified to suit existing local conditions based on practical experiences and status of resource-limited farmers in the Ilocos.

The technology describes herein includes the recommended planting schedule, specific cultural management practices and suggested methods of harvesting tomato fruits during off-season planting.

The Technology

Planting Schedule

- May/June - Hot/wet condition
- August/September - Wet/cool condition

Recommended Cultivars

- MMSU Tomato Hybrid 1
- MMSU Tomato Hybrid 2
- MMSU Tomato Hybrid 3

Planting Site

Consider the following site characteristics in the selection of site for planting:

- a. Well-drained.
- b. Preferably with adequate windbreak.
- c. Upland or rolling where waterlogging is not a problem.
- d. Sandy loam to clay soils with pH of 6 to 7.
- e. Have not been previously planted with tomato, tobacco, eggplant or sweet pepper because these sites are likely to be infected with bacterial wilt or other wilt diseases.

Cultural Management

- **Seedling establishment** – Seedlings can be raised in either seedbeds or seed boxes
 - If seed boxes are used, use the ideal soil medium, *i.e.*, a 1:1:1 mixture of garden soil, sand and compost.
 - When raising seedlings in seedbeds, select a site that is open but has sufficient wind break, high in soil organic matter, free from astray animals, and near a water source. Seedbed may vary in size but the ideal is 0.75 m to 1.0 m x 10 m. Prepare the seedbed as follows:
 1. Remove weeds and other debris.
 2. Plow or pulverize the soil to a depth of 15 cm.
 3. Construct beds raised to about 20 to 30 cm.
 4. Sterilize the bed by burning one-inch thick of rice hull or rice straw on top of the seedbed.
 - Sow the seeds in the seedbed as follows:
 1. Make small furrows across the seedbed using a stick or with the forefinger.
 2. Sow the seeds thinly and evenly in the rows.
 3. Cover the seeds with soil.
 - Cover the seedbed with rice straw and sprinkle water.
 - Water the seedbed daily, *i.e.*, early in the morning or late in the afternoon using a sprinkle. This however, depends on the prevailing weather conditions.
 - Cover the seedbed with plastic when rains are continuous.
- **Care of seedlings**
 - If the seedlings appear yellowish, apply urea at 1 tablespoon per gallon of water or ammonium sulfate at 2 tablespoon per gallon of water.
 - Wash-off the fertilizer solution on the leaves by sprinkling tap water in order to avoid leafburning.

- **Land preparation**
 - Zero tillage is recommended in sloping hills and sand dunes.
 - Conventional tillage is recommended in flat uplands.
 - a. Plow the area twice one month before transplanting, followed by harrowing.
 - b. Rotavate the area just before planting to pulverize the soil.
 - c. Construct raised beds (20-30 cm high) for planting.

- **Transplanting**

The seedlings are ready for transplanting 20 to 30 days after sowing. Follow the steps described hereunder for best results.

- Harden the seedlings one week before transplanting by withholding irrigation water and by removing the seedbed cover. Hardening strengthens the plant tissues thereby enabling the seedlings to withstand transplanting shock.
 - Water the seedlings thoroughly to facilitate uprooting and prevent too much root injury.
 - Transplant late in the afternoon to minimize seedling mortality. Set seedlings at a distance of 0.40 m between hills and 1.25 m between rows using a sharp pointed hand dibble.
 - If soil moisture is not sufficient during transplanting irrigate the plants on a hill to hill basis.
 - Replant missing hills one week after transplanting.
- **Care of plants**
 - Provide the plants with trellis to protect the fruits from rat damage and from touching the ground, which causes rotting.
 - Provide the plants with rain shelter (optional) during typhoons to protect the plants from excessive water and wind damage. This also minimizes disease incidence and fruit cracking. Use gauge no. 16 plastic sheet (polyvinyl) as rain shelter.
 - **Fertilizer application**
 - Apply 20 to 30 g complete fertilizer 14-14-14 near the base of the plant during transplanting. This is approximately equivalent to 8 to 12 bags 14-14-14 per hectare.
 - Sidedress 10 g urea and 5 g muriate of potash per plant at 3, 7 and 11 weeks after transplanting. This is equivalent to a total of 12 bags of urea and 6 bags muriate of potash per hectare.
 - After a strong typhoon, sidedress 5 g ammonium sulfate per plant or 6 bags per hectare. This enhances the production of new buds and lateral shoots/branches, which subsequently form flowers and fruits even up to six months after transplanting.

- **Irrigation**
 - Apply supplemental irrigation based on soil moisture and general appearance of the plants.

- **Pest control**
 - **Weeds**
 - Manual weeding is recommended supplemented with cultivation.
 - Apply herbicide sparingly.
 - **Insect pests and diseases**
 - Spray recommended insecticides (Lannate/Decis) and fungicides (Dithane M-45) whenever necessary at the seedling and vegetative stages but not at active fruiting stage.
 - Spray fungicide after heavy rains or typhoons.
 - Mulch the bed with rice straw. Mulch suppresses weed growth and reduces soil erosion in sloping areas. It prevents splashing of soil particles. Splashed soil particles cause the fruits to rot.

- **Harvesting of fruits**
 - When rain is continuous and the crop is not provided with rain shelter, harvest fruits at green mature stage to avoid fruit cracking.
 - During periods of interspersed dry spells, harvest at breaker (half-ripe) stage.
 - Harvest the fruits preferably when dry. If the prevailing condition does not allow, wipe the harvested fruits with a piece of cloth.

- **Ripening**
 - Remove the calyx and sort the fruits according to size.
 - Keep fruits in plastic trays or bamboo baskets lined with newspaper, dry rice straw or banana leaves. If dry rice hull or ash is available, mix and incorporate this thoroughly with the fruits in a container at 1:1 ratio. The rice hull or ash makes the fruit dry by absorbing the moisture and keep the spoiled ones insulated from good ones.

Benefits/Advantages

Tomato production during the off-season is highly profitable (Table 1). Following the above off-season tomato production technology a net return of ₱ 303,690.00 per hectare could be attained. This is equivalent to a cost benefit ratio of 4.80.

Table 1. Production economics of tomato production following the recommended off-season tomato production technology¹.

PARTICULARS	MAN-DAY	COST (₱)
A. Labor Cost		28,650
1. Land preparation @ ₱0.27/m ² (2x plowing)		5,400
2. Raised-bed preparation	20	3,000
3. Seedling establishment	10	1,500
4. Transplanting/mulching	15	2,250
5. Irrigation	10	1,500
6. Fertilizer application	15	2,250
7. Trellising	25	3,750
8. Weeding	25	3,750
9. Spraying	15	2,250
10. Harvesting and storage	20	3,000
B. Material Cost		34,560
1. Fertilizer		
a. Complete, 12 bags @ 480/bag		5,760
b. Urea, 12 bags @ 550/bag		6,600
c. Muriate of potash, 6 bags @ 590/bag		3,540
d. Ammonium sulfate, 6 bags @ 290/bag		1,740
2. Pesticide		
a. Lannate, 3 pack @ ₱490/pack (425g/pack)		1,470
b. Decis, 2L @ 1,200/L		2,400
c. Dithane, 3 kg @ ₱290/kg		1,050
3. Trellis, 10,000 pcs @ ₱0.40/pc		4,000
4. Rice straw, 400 bundles @ ₱5/bundle		2,000
5. Oil and gasoline		1,000
6. Seed cost, 200 g @ ₱15.00/g		3,000
7. Harvesting and storage containers, 20 pcs @ 100/pc		2,000
C. Return		
Average Yield 24.43 t/ha		366,450
Net Return (RAVC)		303,690
D. Benefit-Cost Ratio (BCR)		4.80

MD – Man-days @ 150/man-day

¹ - 2001