

TECHNOLOGY FOR CHILI PRODUCTION IN BHUTAN

I. PRE-PRODUCTION STAGE

A. Growing Conditions

Criteria	Description
1. Altitude	<ul style="list-style-type: none">• Between 250 metres above sea level (masl) such as in southern Dzongkhags to 2,600 masl like in Bumthang and Ha Dzongkhags• Growing seasons:<ol style="list-style-type: none">a. Below 800 m (low elevation) – November to Aprilb. b) Between 800 m to 1,500 m (mid-elevation) – February to Octoberc. c) Above 1500 m (high elevation) – April to September
2. Soil pH	<ul style="list-style-type: none">• pH range of 5.5 to 6.8.
3. Soil texture	<ul style="list-style-type: none">• Grow ideally in loamy to clay loamy soils.
4. Temperature	<ul style="list-style-type: none">• Grow best at 15° -32° C.

B. Choice of Variety

The choice of variety depends on end-users or market demand. Sha ema and Baegop ema are suitable both for fresh and dried purposes with high demand in the domestic market while Super solo is suitable for fresh and salad purposes but with less demand in the market at the moment. The recommended varieties are given below:

Variety Name	Altitude (masl)	Recommended Dzongkhags	Days to Maturity	Pest/Disease Reaction	Potential Yield (t/ha)
Sha Ema	250 - 2,600	All Dzongkhags	Depends on elevation/ temperature	Susceptible to Phytophthora wilt and chili mosaic virus	No data available
Baegop Ema	250 - 2,600	All Dzongkhags	Depends on elevation/ temperature	Susceptible to Phytophthora wilt and chili mosaic virus	No data available
Super Solo	1,000 - 2,600	In most of the Dzongkhags	Depends on elevation/ temperature	Susceptible to Phytophthora wilt and chili mosaic virus	48

Characteristics of Main Chili Varieties Grown in Bhutan

Sha Ema

- Plant size: Medium
- Fruit orientation: Pendent
- Fruit shape: Elongated, shoulder at the calyx area and with blunt tips
- Fruit colour (not ripe): Green
- Fruit colour (ripe): Red
- Fruit length: 8 cm
- Fruit width: 2.4 cm
- Average fruit weight: 23.7 g
- Seed percentage: 8%
- Pedicel length: 3.1 cm
- Fruit wall thickness: 0.3 cm (thick)
- Pungency: Mild
- Number of lobes: 3
- Yield: 15-25 t/ha



Baegop ema

- Plant size: Medium
- Fruit orientation: Pendent
- Fruit shape: Elongated, no shoulder, calyx covering the entire base of fruit and with pointed tips
- Fruit colour (not ripe): Green
- Fruit colour (ripe): Red
- Fruit length: 8.7 cm
- Fruit width: 1.7 cm
- Average fruit weight: 20.5 g Photo courtesy of RNR RC Bajo Photo courtesy of RNR RC Bajo
- Seed percentage: 9%

- Pedicel length: 3.2 cm
- Fruit wall thickness: 0.25 cm (thick)
- Pungency: Mild
- Number of lobes: 3
- Yield: 15-25 t/ha



Super Solo

- Plant height: 61 cm
- Pungency: Milder than Sha Ema though fruit shape is similar but pointed tips
- Fruit length: 18.5 cm
- Fruit width: 4 cm
- Fruit weight 80 g and fruit wall is thicker than Sha emma
- Good as fresh vegetable and salad purposes
- Not suitable as dried chili as it is difficult to dry and the quality of dried chili is poor



II. PRODUCTION STAGE

1. Nursery Preparation

- Plough and pulverize the soil thoroughly. Prepare nursery bed measuring 1 m wide and 15-20 cm high and of convenient length (3-5m).
- Treat seeds with Bavistin (Carbendazim) at 2 g/kg seed, against Phytophthora and other seed-borne diseases.
- Use seed rate of about 0.5-1 kg of quality seed per acre with minimum germination of 75%.
- Sow seeds about 2 cm deep in lines at 10 cm apart.
- In mid-elevation areas, raised nursery in polytunnel for early chili production and normal open nursery for main season chili production.
- In high-elevation areas, sow the seeds in plastic tunnel. This will bring forward the growing season by one month.
- The seedlings are ready for transplanting in about 30-60 days after sowing depending on the elevation under ambient conditions or when the seedlings attained 12-15 cm height.

Photo courtesy of RNR RC Wengkhari - 183 - 2. Field Preparation

- Cultivate, pulverize, and level the field after bringing soil to a good tilth.
- Raise 1 m wide, 15-20 cm high beds and any convenient length (3-5 m). Ensure proper levelling of field and beds for water and disease management. Raised bed and drainage is important for chili wilt management
- Apply 10-12 t of well rotten Farm Yard Manure (FYM) and 20:30:15 NPK kg/acre as basal dose. • Apply all FYM during field preparation. Apply all the basal fertilizer at about 9- 10 g of fertilizer mixture per planting hill and mix them into the soil using hand hoes.

2. Transplanting

- Transplant seedlings of 12-15 cm high, preferably during evening time and water immediately to avoid transplanting shock.
- Transplant the seedlings at 45 cm between rows and 30 cm between plants in a row or a population of at least 25,000 plants per acre.
- Top-dress the crop with 10 kg of additional nitrogen after 30 and 60 days after transplanting. Split the top dressing fertilizer in two halves in very light soils.

3. Weeding

- Maintain the crop free from weeds to avoid competing for water, air, nutrients, and space and eventually effecting on crop performance.
- Apply 3-4 weeding/hoeing depending upon the weed pressure, soil structure, and weather conditions of the locality.

4. Irrigation

- Irrigate manually using water cans or hose pipe. The frequency of irrigation depends on the moisture retention capacity of the soil, amount and frequency of rainfall, and local weather conditions (evapo-transpiration).
 - Maintain the soil moisture regime at field capacity right after transplanting until harvest.
 - Avoid excess water or water-logging as it is harmful to plants and makes congenial environment for phytophthora wilt disease to explode and completely destroying the crop.
5. Harvesting
- Chili matures in 120-130 days after sowing in mid-altitudes and might take even longer in higher elevation or harvest it when few fruits turns red colour.
 - Do 3-6 harvests/pickings depending on the elevation of area and crop management aspects. At higher elevation, do less numbers of pickings than in mid elevation areas.

References:

1. Additional New Horticulture Technology (2005), RNR RC-Bajo, CORRB, MOA.
2. Package of Practices for Vegetable Production (2001), Horticulture Section, RNR RC-Bajo, DRDS, Ministry of Agriculture.
3. Guidelines for Chili cultivation (1994), IHDP, Ministry of Agriculture.
4. RNR Technical recommendation (2003), RNR RC-Khangma, DRDS, Ministry of Agriculture.
5. Facts and Figures of RNR Sector 2003. PPD, Ministry of Agriculture. 6. RNR Statistics (2004), DOA, MOA.