Seed grading

- Grade the seeds with round perforated metal sieves having 8 / 64" diameter.
- Remove the discoloured seeds.

Storage

- Store the seeds with a seed moisture content of 8 - 9 % in gunny or cloth bags for short term storage (8 - 9 months).
- Store the seeds with a seed moisture content of 7 - 8 % in poly lined gunny bag for medium term storage (12 - 15 months).
- Store the seeds with a seed moisture content less than 7 % in 700 gauge polythene bag for long term storage (more than15 months).

(vi) BENGALGRAM (*Cicer arietinum L.*)

CLIMATE REQUIRMENT

T_Max°C	T_Min°C	Optimum °C	Rainfall mm	Altitude m MSL
35 - 45	6 - 8	20 - 25	500 - 800	2500

Tropical and subtropical winter season crop. The field should have loose tilth and good drainage. Long day plant. Severe cold and frost at the time of flowering causes detrimental effect to gram seed development.

CROP IMPROVEMENT

i. SEASON AND VARIETIES

District /Season	Varieties
November (Winter season) Rainfed Vellore, Tiruvannamalai, Salem, Namakkal, Tiruchirapalli, Perambalur, Karur, Dharmapuri, Pudukottai, Erode, Coimbatore, Madurai, Dindigul, Theni, Virudhunagar, Ramanathapuram, Sivagangai, Tirunelveli, Thoothukudi	CO 4

II. Description of chickpea variety

Particulars	CO 4
Year of Release	1998
Year of Notification	SO. 425 (E) / 08.06.1999
Parentage	Cross derivative of ICC 42 x ICC 12237
50% flowering	40
Duration (days)	85
Grain yield (kg/ha)	
Rainfed	1150
Height (cm)	35-40
Branches	3-5
Flower colour	Light pink & veined
Colour of grain	brown
100 grain wt (g)	30-32

(iii) SEED RATE

- CO 3 - 90 kg/ha.
- CO 4 - 75 kg/ha.

CROP MANAGEMENT

ii. MANAGEMENT OF FIELD OPERATIONS

1. FIELD PREPARATION

Prepare the land to fine tilth and apply 12.5 t FYM/ha

2. SEED TREATMENT

Treat the seeds with Carbendezim (or) Thiram @ 2g/kg of seed 24hrs before sowing (or) with talc formulation of *Trichoderma viride* @ 4 g/kg seed (or) *Pseudomonas fluorescens* @ 10 g/kg seed. Biocontrol agents are compatible with biofertilizers. First treat the seeds with biocontrol agents and then with Rhizobium. Fungicides and biocontrol agents are incompatible. The above seed treatment will protect the seedlings from seed borne pathogens in the early stages.

3. SEED TREATMENT WITH BIOFERTILIZER

Treat the seeds with one packet (200 g/ha) of Rhizobial culture and one packet (200 g/ha) of Phosphobacteria developed at TNAU using rice kanji as binder. If the seed treatment is not carried out apply 10packets of Rhizobium (2 kg/ha) and 10 packets(2 kg) of Phosphobacteria with 25 kg of FYM and 25 kg of soil before sowing. Dry the biofertilizer treated seeds in shade for 15 minutes before sowing.

4. FERTILIZER APPLICATION

a) Apply fertilizers basally before sowing.
Rainfed : 12.5 kg N + 25 kg P_2O_5 + 12.5 kg K_2O +10 kg S*/ha Irrigated : 25 kg N + 50 kg P_2O_5 + 25 kg K_2O + 20 kg S*/ha
*Note : Applied in the form of Gypsum, if Single Super Phospate is not applied as a source of phosphorus

5. SOWING

Dibble the seeds by adopting a spacing of 30 cm x 10 cm.

6. WEED MANAGEMENT

i) Pre emergence application of Pendimethalin @ 0.75 litres / ha on 3rd day after sowing using Backpack/ Knapsack/Rocker sprayer fitted with flat fan nozzle using 500 litres of water for spraying one ha followed by one hand weeding on 25 - 30 days after sowing.

ii) If herbicide is not applied give two hand weedings on 15th and 30th day after sowing.

7. INTERCROPPING IN BENGALGRAM

Bengalgram in paired row planting with one or two rows of Coriander as intercrop would give the highest return. Wheat can also be intercropped in deep black cotton soil in Coimbatore, Erode, Salem, Namakkal and Dharmapuri districts.

CROP PROTECTION

A. Pest management

Economic threshold level for important pests

Pest	ETL
Gram caterpillar	2 early instar larvae/plant 5-8 eggs/plant
Aphids	20/2.5 cm shoot length

Pest Management strategies

Aphid *Aphis craccivora*	**Spray any one of the following :** Methyl demeton 25 EC 500 ml/ha Dimethoate 30 EC 500 ml/ha
Gram caterpillar *Helicoverpa armigera*	• Pheromone traps for *Helicoverpa armigera* 12/ha • Bird perches 50/ha • Mechanical collection of grown up larva and blister beetle • Ha NPV 3 x10^{12} POB/ha in 0.1% teepol • *Bacillus thuringiensis* var *kurstaki* 5%WP 1000-1250 g/ha (Note : Insecticide / Ha NPV spray should be made when the larvae are upto third instar) **Apply any one of the following insecticides:** Azadirachtin 0.03 % WSP 2.5kg/ha Benfuracarb 40% EC 2.5l/ha Chlorantraniliprole 18.5% SC 150ml/ha Chlorpyriphos 20 EC 1250 ml / ha Emamectin benzoate 5% SG 220 g/ha Ethion 50% EC 1.0 l/ha Flubendiamide 39.35 % SC 100ml / ha Indoxacarb 14.5% SC 350 ml/ha Indoxacarb 15.8% SC 333 ml/ha Lufenuron 5.4% EC 600ml/ha Methomyl 40%SP 750g/ha Monocrotophos 36%SL 625-1250ml/ha Neem oil 2% Quinalphos 1.5%DP 23kg/ha Quinalphos 25 %EC 1400ml/ha Spinosad 45%SC 125 ml/ha • Thiodicarb 75 WP 625g / ha
Storage pests	• Dry the seeds adequately to reduce moisture level to 10 %. • Use pitfall traps or two in one model trap to assess the time of emergence of field carried over pulse beetle in storage and accordingly sun-dry the produce. • Mix Malathion 5 D 1 kg for every 100 kg of seed • Pack in polythene lined gunny bags for storage

Disease Management

Seed treatment: Treat the seeds with *T. asperellum* @ 4 g or *P. fluorescens* @ 10 g/kg or Carbendazim @ 2 g/kg or Thiram @ 4 g/kg of seeds

Disease	Recommendations
Wilt: *Fusarium oxysporum* f. sp. *ciceri*	Soil application with P. *fluorescens* @ 2.5 kg/ha with 50 kg of well decomposed FYM or sand
Root rot: *Macrophomina phaseolina (Rhizoctonia bataticola)*	• Soil application of *P. fluorescens* or *T. asperellum* @ 2.5 kg / ha with 50 kg of well decomposed FYM or sand • Spot drench with Carbendazim @ 1 g/l

BENGAL GRAM - SEED PRODUCTION

Land requirements

- Land should be free of volunteer plants. The previous crop should not be of the same variety or other varieties of the same crop. It can be the same variety if it is certified as per the procedures of certification agency.

Isolation

- For certified / quality seed production leave a distance of 5 m all around the field from the same and other varieties of bengal gram.

Pre-sowing treatment

- Soak the seeds in 1 % KH_2PO_4 for 3 h in 1/3rd volume of solution and shade dry the seeds to bring back to original seed moisture content.
- Avoid bruchid infested seed for seed purpose.

Harvesting

- Harvest the crop at once when 70 - 80 % of pods are creamy yellow in colour.

Seed grading

- Grade the seeds using 13 / 64” or 18 / 64" sieves depending on the variety.
- Dry the seeds to 8 - 10 % moisture content

Pre-storage seed treatment

- Treat the seeds with Carbendazim @ 2 g / kg of seed.
- Treat seeds with Halogen mixture ($CaOCl_2$ + $CaCO_3$ + *arappu* (*Albizzia amara*) leaf powder mixed in a ratio of 5:4:1@ 3 g / kg of seed as eco-friendly treatment.

Storage

- Store the seeds with a seed moisture content of 9 - 10 % in gunny or cloth bags for short term storage (8 - 9 months).

- Store the seeds with a seed moisture content of 8 - 9 % in polylined gunny bag for medium term storage (12 - 15 months).
- Store the seeds with a seed moisture content less than 8 % in 700 gauge polythene bag for long term storage (more than 15 months).

(vii) GARDEN LAB LAB (AVARAI)

(*Lab lab purpureus* (L.) var. *typicus*.)

CLIMATE REQUIREMENT

T_Max°C	T_Min°C	Optimum °C	Rainfall mm	Altitude m MSL
42	14	22–28	650 - 3000	2000 - 2400

Tropical and sub tropical crop. Lablab is a summer - growing annual or occasionally short - lived perennial forage legume. Lablab tolerates some flooding but does not withstand poor drainage or prolonged waterlogging. Lablab does better in full sunlight.

CROP IMPROVEMENT

I. SEASON AND VARIETIES

District/season	Varieties
Adipattam (July - Aug) Kanjipuram, Tiruvallur, Dharmapuri, Coimbatore, Madurai, Dindigul, Theni, Vellore, Tiruvannamalai, Ramanathapuram, Virudhunagar, Sivagangai, Tirunelveli, Thoothukudi, Salem, Namakkal, Thanjavur, Tiruvarur, Nagapattinam, Tiruchirapalli, Perambalur ,Karur, Pudukkottai, Kanyakumari, Erode	CO (Gb) 14
Puratasipattam (September - November) Kancheepuram, Tiruvallur, Tiruchirapalli, Perambalur, Karur, Vellore, Tiruvannamalai, Cuddalore, Villupuram, Dharmapuri, Salem, Namakkal, Pudukkottai, Erode,Coimbatore, Madurai, Dindigul, Theni, Ramanathapuram, Sivagangai, Virudhunagar, Tirunelveli, Thoothukudi, Thanjavur, Tiruvarur, Nagapattinam,	CO (Gb) 14
Summer (April) Kanchipuram, Tiruvallur, Vellore, Tiruvannamalai, Cuddalore, Villuppuram, Dharmapuri, Salem,	CO (Gb) 14