Seed grading

- Grade the seeds using BSS 7 x 7 wire mesh sieve.
- Discard the discoloured and broken seeds for sowing or storage.

Pre-storage seed treatment

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

Storage

- Store the seeds with a seed moisture content of 10 - 12 % 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 than15 months).

(iv) COWPEA (*Vigna unguiculata* (L.) Walp.aggreg.)

CLIMATE REQUIREMENT

T_Max°C	T_Min°C	Optimum °C	Rainfall mm	Altitude m MSL
35	15	20 - 30	400 - 600	32

Cowpea is called the "hungry - season crop" because it is the first crop to be harvested before the cereal crops. Cowpea is tolerant of shading and can be combined with tall cereal plants such as sorghum and maize. It is sensitive to waterlogging, though less than other legumes. High moisture may hinder cowpea crops in the sub - humid tropics due to many diseases. Frost can damage the plant during flowering period.

CROP IMPROVEMENT

I. SEASON AND VARIETIES

DISTRICT/SEASON	VARIETIES
Adipattam (June-August) For all districts except Kanyakumari and Nilgiris	Co(CP) 7
Purattasipattam (September - November)	Co(CP) 7, VBN 3

Vellore, Thiruvannamalai, Dharmapuri, Salem, Namakkal, Perembalur, Erode, Coimbatore, Madurai, Dindigul, Theni and Virudhunagar	
Margazhi - Thaipattam (December – February) Kanchipuram, Thiruvallur,Vellore, Thiruvannamalai, Dharmapui,Salem,Namakkal, Coimbatore, Erode, Madurai, Dindigul, Theni, Tiruchirappalli, Perambalur, Ariyalur, Karur, Pudukkottai, Tirunelveli and Thoothukudi	Co(CP) 7, VBN 3

I. Description of Cowpea varieties

Particulars	**Co (CP) 7**	**VBN 3**
Year of Release	2002	2017
Year of Notification	SO.1177(E)/25.08.2005	S.O. 6318(E) / 26.12.2018
Parentage	Gamma mutant of Co 4 (20 Kr)	TLS 38 x VCP 16-1
50%flowering(days)	40 – 45	50-55
Duration (days)	70 – 75	75-80
Grain yield(kg/ha)		
Rainfed	1000	1010
Irrigated	1600	-
Plant height (cm)	40 – 55	65 - 70
Stem, branches	Green with purple ring at fruiting nodes, 5 – 8 branches	Determinate plant type, synchronized maturity
Leaves	The terminal leaflet has sub hastate shape	The terminal leaflet has sub globose shape
Colour of pods	Green	Creamy white colour and glabrous pods
Dry	Light brown	Light brown
Colour of grain	Brownish white and square shape.	Light brown and kidney shape
100 grain wt (g)	12 – 14	12.5 – 13.5

III. SEED RATE

Seed rate (pure crop) : 25 kg/ha

CROP MANAGEMENT

IV. MANAGEMENT OF FIELD OPERATIONS

1. FIELD PREPARATION

Prepare the land to fine tilth and form beds and channels.

2. SEED TREATMENT

Treat the seeds with Carbendazim or Thiram 2 g/kg of seed 24 hours before sowing (or) with talc formulation of *Trichoderma viride* @ 4g/kg of 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.

3. SEED TREATMENT WITH BIOFERTILIZER

a) Fungicide-treated seeds, should be again treated with a bacterial culture. There should be an interval of atleast 24 hours between fungicidal and biofertilizer treatments.

b) The improved rhizobial strain COC 10 is more effective in increasing the yield. Treat the seeds with one packet (200 g/ha) of Rhizobial culture (COC 10) 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 10 packets (2 kg/ha) 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 Phosphate is not applied as a source of phosphorus

b) Soil application of 25 kg $ZnSO_4$/ha along with 50 kg FYM or sand under irrigated condition

c) Soil application of 10 kg borax, 0.25 kg Ammonium molybdate can be followed if the soil is deficient.

5. SOWING

Dibble the seeds adopting the following spacing.

Varieties	Spacing
VBN 3	30 cm X 15 cm
CO(CP) 7	45 cm x 15 cm

6. WATER MANAGEMENT

Irrigate immediately after sowing followed by life irrigation on third day. Irrigate at interval of 7 to 10 days depending upon soil and climatic conditions. Flowering and pod formation stages are critical periods when irrigation is a must. Avoid water stagnation at all stages. Apply KCl at 2.0 per cent as foliar spray during vegetative stage if there is moisture stress.

7. FOLIAR APPLICATION

a. Foliar spray of DAP 20 g/litre or urea 20 g/litre once at flowering and another at 15 days thereafter to enhance flower number and pod setting

b. Foliar spray of NAA 40 mg/litre once at flowering and another at 15 days thereafter to reduce flower drop

c. Foliar spray of salicylic acid 100 mg/litre once at flowering and another at 15 days ther after to improve seed yield.

8. WEED MANAGEMENT

i) Pre emergence application of Pendimethalin @ 0.75 litre / ha on 3 days after sowing using Backpack/ Knapsack/Rocker sprayer fitted with flat fan nozzle using 500 lit of water for spraying one hectare followed by one hand weeding on 30 days after sowing gives weed free environment throughout the crop period.

ii) If herbicide is not applied, give two hand weeding on 15 and 30 days after sowing.

CROP PROTECTION

A. Pest management

Pests	ETL
Aphids	20nos. /2.5 cm shoot length
Spotted pod borer	3larvae /plant
Stem fly	10% of affected plants

Pests Management strategies

Stem fly *Ophiomyia phaseoli*	Seed treatment with dimethoate 30 EC 5 ml/kg of seed
Aphids *Aphis craccivora* **Whitefly** *Bemisia tabaci*	**Spray any one of the following** Methyl demeton 25 EC 500 ml/ha Dimethoate 30 EC 500 ml/ha
Blue butterflies *Lampides boeticus* *Euchrysops cnejus*	Chlorantraniliprole 18.5% SC 100ml/ha
Spotted pod borer *Maruca vitrata*	• Thiodicarb 75% WP 750g/ha
Storage pests Bruchid- *Callosobruchus chinensis* *C. maculatus*	• 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 seed • Pack in polythene lined gunny bags for storage
Pod bug	• Dimethoate 30% EC 500ml/ha • Methyl demeton 25% EC 500ml/ha

B. 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
Rust: *Uromyces appendiculatus*	Two sprays of Chlorothalonil 0.1% or one spray with 0.1% Chlorothalonil followed by 3% neem oil after the appearance of disease
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

Aphid borne mosaic: (Potyvirus) (Vector: *Aphis craccivora, A. fabae, A. gossypii* and *Myzus persicae)*	Roguing out the virus infected plants in the early stage of growth up to 30 days and spraying twice at fortnightly intervals with Methyl demeton 25 EC @ 500 ml/ha or Dimethoate 30 EC 500 @ ml/ha or Iimidacloprid 17.8 SL @ 250ml/ha

SEED PRODUCTION
COWPEA - VARIETAL SEED PRODUCTION

Land requirement

- 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 cowpea.

Season

- September - October and June - July.

Intercultural operation

- Clip the tendrils for promotion of flower production.
- Up root and destroy the plants exhibiting severe symptoms of mosaic in the early stages of growth.
- Spray NAA 40 ppm (40 mg in 1 litre) at first flowering to reduce flower drop.
- Spray 2 % DAP at flower initiation and at peak flowering to promote pod setting.

Harvesting

- Seeds attain physiological maturity 27 - 30 days after anthesis. At this stage the seed moisture content will be around 18 per cent.
- Harvest the pods as they turn light straw in colour and the seeds turn brown or mottled.
- Harvest the pods as picking (4 - 5 nos.) at 10 days interval.
- Shade dry the pods for 1 - 2 days and then sundry until they become brittle.
- Beat the pods with pliable bamboo stick or pulse thresher by adjusting the cylinder speed to avoid splitting and cracking of seeds.

Seed grading

- Grade the seeds with 10 / 64" or 12 / 64" round perforated sieves.

Drying

- Remove the broken and immature seeds.
- Dry the seeds to 8 - 10 % moisture content

Pre- storage seed treatment

- Treat the seeds with Carbendazim @ 2 g / kg of seed along with Carbaryl 200 mg / kg of seed.
- Treat seeds with Halogen mixture ($CaOCl_2$ + $CaCO_3$ + *arappu* (*Albizzia amara*) leaf powder mixed in the ratio of 5:4:1 @ 3 g / kg as eco-friendly treatment.

Storage

- Store the seeds with a seed moisture content of 10 - 12 % 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).
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