COOL SEASON VEGETABLES (Ad hoc recommendation)

1. CABBAGE *(Brassica oleracea* vaT. *capitata)*

Cabbage can be grown in high ranges during winter season. Well-drained sandy loam to clay loam soil is suited for this crop.

Varieties

September, Pusa Drum Head, Golden Acre, Kaveri, Ganga, Sri Ganesh and Pride of India.

Planting requirements

Since it is a cool season crop, sowing is done from August-November. Seed rate is 500- 750 g/ha. Seeds are to be sown in nursery beds. Three to five weeks old seedlings are used for transplanting. Field is prepared by three or four ploughings. Seedlings are transplanted at a spacing of 45 x 45 em.

Manures and fertilizer_

Apply 25 t/ha FYM or compost. Fertilizer dose is N:P2Os:K2O 150:100:125 kg/ha. Apply full dose of P2Os and half dose of N and K2O before, transplanting. Apply remaining half dose one month after transplanting.

Aftercultivation

A continuous supply of moisture is necessary for proper development of heads. Very shallow hoeing should be done to remove weeds and to make the soil better aerated. In order to produce large heads; earth up plants one month after transplanting.

2. CAULIFLOWER *(Brassica oleracea* vaT. *botrytis)*

Cauliflower can be grown during winter in high ranges. Well-drained sandy loam to clay loam soils are suited for the crop.

Varieties

Pusa Early Synthetic, Himani, Swathi, Pusa
Deepali, Early Patna,-74-6-C

Planting requirements

Since it is a cool season crop, sowing is to be done from Aug-Nov. Seed rate is 600-750 glha. Seeds are to be sown in nursery beds. Three to five week old seedlings are used for transplanting. Field is prep.ared by

three or four ploughings. Seedlings are transplanted at a spacing of 60 x 45 cm.

Manures and fertilizers

Apply FYM or compost @ 25 t/ha and fertilizers @ 150:100:125 N:P20S:K2O kg/ha. Apply full dose of P2Os and half dose of N and K2O before transplanting and remaining Nand K one month after transplanting.
Aftercultivation

A continuous supply of moisture is necessary for proper dev.elopment of curds. Very shallow hoeing should be done to remove the weeds and to loosen the soil for better aeration. In order to produce large curds,

earth up the plant one month after trans

planting. .

3. CARROT *(Daucus carota)*

Carrot can be grown in high ranges from August to January. Well-drained sandy loam soil is best suited for the crop.

Varieties

Pus a Kesar, Nantes, Pusa Meghali Planting requirements

Seed rate is 5-6 kg/ha. It is usually sown on ridges to facilitate good root production. Ridges of about 20 _m height are made 45 cm apart and seeds sown 10 cm apart on the rows: 'The seed is mixed with fine sand and sown in rows by hand and covered with soil to make it firm around it.

Manures and fertilizers Apply 25 t/ha FYM before sowing and a

fertilizer dose of 37.5 kg N, 62.5 kg P20S and 50 kg K2O / ha as basal. Topdressing with 37.5 kg N / ha may be done one month after sowing.

Aftercultivation

It is necessary that enough soil moisture is available to help uniform seed germination and growth of plant. Uproot excess seedlings (thinning) three weeks after sowing leaving a plant to plant spacing of 10 em to facilitate better tuber growth. Weeding should be done at regular intervals to keep down the weeds. Shallow hoeing is necessary to - facilitate root growth. When the root starts growing, earthing up should be done.

4. BEET ROOT *(Beta vulgaris)*

Beet root can be grown in high ranges from August to January. Well-drained sandy loam soils are best suited for the crop.

Varieties: Detroit Dark Red and Imperator Planting requirements

Seed rate is7 to 8 kg/ha. It is usually grown on ridges to facilitate good root production. Ridges of about 20 cm height are formed 45 cm apart and seeds sown 15-20 cm apart on the rows. The seeds are mixed with fine sand and placed in rows by hand and covered with soil to make -it firm around it.

Manures and fertilizers

Apply FYM 20 t/ha as basal. N:P2Os:K2O

75:37.5:37.5 kg/ha is recommended. Full dose of P20S and K2O and half dose ofN

are applied as basal. Remaining half dose ofnitrogen is applied as topdressing when the plant starts growing vigorously.

AftercuJtivation

It is necessary that enough soil moisture is available to help uniform seed gennination and growth of plant. Thinning the popula
tton may be done as in carrot. Weeding
should be done at regular intervals to keep down the weeds. Shallow hoeing is necessary to facilitate root growth. When the root starts growing, earthing up should be done.

5. RADISH *(Raphanus sativus)*

Radish can be grown in high ranges .from June to January. Well drained sandy loam soils are best suited for the crop.

Varieties

Japanese White, Arka Nishanth, Pusa Chethki, Pus a Reshmi, Pusa Desi and Bombay Red Long

Planting requirement

Seed rate is 7 to 8 kg per hectare. It is usually grown on ridges to facilitate good root production. Ridges of about 20 cm height are taken 45 cm apart and plants are grown 10 cm apart on the rows. The seed is mixed with fine sand and sown in rows by hand, covered with soil to make it firm around it.

Manures and fertilizers

Apply 20 t/ha FYM as basal. N: P20S: K2O 75:37.5:37.5 kg/ha is the fertilizer require_ ment. Full dose of P2Os and K2O and half dose of N are applied as basal. Remaining half dose of nitrogen is. applied as topdressing when the plant starts growing vigorously.

Aftercultivation

It is necessary that enough soil moisture is
-available to help uniform seed germination and growth of plant. Thinning may be done at 10 cm distance as in carrot. Weeding should be done at regular intervals to keep down weeds. Shallow hoeing is necessary to facilitate root growth. When the roots start growing, earthing up should be done.

6. POT A TO *(Solanum tuberosum)*

Potato can be successfully cultivated in the high ranges of Kerala. It is being cultivated in the rain shadow areas of Idukki district throughout the year.

A day temperature of 20-30°C is optimum for growth and tuberisation in potato. Tuber formation is adversely affected, if the teItl- perature goes above 30°C.

Season

Crops can be raised as shown below in the

. eastern part of Idukki district.

Suml1ler:
Autumn:
Spring:

March-April

August-December January-February

Varieties

Among the high yielding varieties, Kufri Jyothi (early), Kufri Muthu (medium), and Kufri Dewa (late) can be tried in the high ranges of Kerala.

Soil

Loose friable sandy loam or silt loam, rich in organic matter are ideal for potato. Hard

clay should be avoided. Optimum pH range is 5.2-7.0

Planting

Whole potato tuber or cut pieces (50-60 g size)' longitudinally cut from bud-end to stem-end can be used for plating. For planting I ha, 1000-2000 kg seed tubers are required. Seed tubers are treat_d with I ppm of GA 3 for one hour and then dried in shade for getting uniform sprouting. Tubers are filled in gunny bags after drying and kept in vertical position in well-ventilated dark room for 10 days for encouraging sprouting. Seed pieces should be treated with mancozeb (@ I kg in 450 litres ofwater) before planting to protect them from soil borne diseases.

Tubers can be planted on ridges 50-60 cm wide at a spacing of 15-20 qn between the plants. Earthing up is needed during the growing phase (30 days after planting) and 70 days after planting.

Manuring

A basal application of FYM (20 t/ha) is re

quired during field preparation. Apply 60 kg N, 100 kg PzOs and 120 kg KzO as basal. Topdressing with 60 kg N, 30 days after planting at the time of first earthing up is essential.

Plant protection

Early blight and late blight are the important fungal diseases. Spraying zineb (2 g per 11

tre of water) is effective to control early blight. Copper fungicides can control late blight. Cut worms, aphids and jassids are common p_sts of potato. Dusting with carbaryl 10 % DP immediately after planting can control cut worms. Spraying endosulfan @ 1.5 ml per litre controls leaf eating caterpillars. To control aphids and jassids spraying metasystox or dimethoate (I ml per litre) is effective.

7. GARLIC *(Allium sativum)*

Garlic requires cool and moist period during vegetative growth and a dry spell during maturity of the bulbs. Fertile, well-drained loamy soils are ideal for garlic cultivation. Heavy clay soils may result in deformed bulbs. In high ranges of Kerala garlic can be 'planted during October-November.

Varieties: Ooty-I, G 50

Planting requirements

Cloves or bulbils are used for propagation. For planting one hectare, 500 kg of cloves is required. The cloves for planting should be stored for 2-3 months after harvest and cloves weighing 4 g are ideal for planting. The cloves should be soaked in water followed by dipping for 15 minutes in a solution containing I ml of dimecron and I g of carbendazim dissolved in I litre of water for 15 minutes. After drying in shade, cloves can be used for planting.

Dig the land thoroughly and prepare beds of 15 cm height at a width of I m and of con

venient length. The cloves should be dibbled at a spacing of 15 x 8 cm. Germination will start on the fifth day and it will be completed within 10-15 days.

Manuring

Apply N:PzOs: K2O @, 60:120:120 *kg/ha* 20 days after transplanting (DAP). Topdressing of N should be done @ 60 kg/ha, 45 OAP. .

Aftercultivation .'

Earthing up should be done 60 qAP

Plant protection

To control thrips and foliar nematode, spray I ml of dimecron dissolved in I litre of water. To control blast, spray mancozeb (2 g/litre).

Harvest

Harvesting can be done 120-130 OAr.
Yield may vary from 5-10 *t/ha.*

MINOR VEGETABLES

Dolichos bean *(Lablab purpureus)*

Pusa Early Prolific and Arka Vijay are the common pole and bush varieties, respectively. Pole varieties are sown in pits (three plants per pit) at a spacing of 1.25 x

0.75 m and bush varieties in ridges and furrows at a.

spacing of 60 x 15 cm. Seeds are to be sown during July-August. The plants are trailed over pandals, trellis or stakes. FYM is applied at the rate of 20 tlha. N:P2Os: KzO recommendation for the crop is 50: 100:50 kglha. The leaf caterpillar is a common pest of the crop. It is also affected

by *Fusarium* wilt, collar rot, anthracnose and powdery mildew. Average yield is 6-10 tfha.

Winged bean *(Psophocarpus tetragonolobus)*

The common varieties in use are Revathy, PT-62, PT-16, PT-49 and PT-2. Seeds at the rate of 15 to 20 kgfha are planted at a spacing of 125 x 50 em during August-September and are trailed over pandal, trellis or stakes. FYM is applied at the rate of 20 t/ha. N, P2Os and K2O recommendation for the crop is 50: 100:50 kgfha. The crop is comparatively free from pests and diseases. A verage yield is 10-15 tfha.

Cluster bean *(Cyamopsis tetragonoloba)*

Pusa Naubahar and Pusa Sadabahar are the common varieties. Seeds at the rate of 10 to 12 kgfha are planted at a spacing of 45_6Q x 20-30 cm in February-March and June-July. During rainy season, the s_eds are sown 2-3 cm deep on ridges and in furrows during summer months. FYM is applied at the rate of 25 tfha. N, P2Os and K2O recommendation for the crop is 20:60:80 kgfha. Aphids and powdery mildew are the common pest and disease of the crop. Average yield is 5 to 6 t/ha. .

Sword bean *(Canavalia* spp.)

There are two types of sword bean based on seed colour. White seeded varieties. are
bushy in nature whereas red seeded varieties are trailed over pandals. Pole type varieties are to be planted at a spacing of 4 x 3 m whereas bush type varieties are to be planted at 60 x 60 em. May-June and September-October are the usual sowing tilJle and the seed rate followed is one or two seeds per pit. FYM is applied at the rate of
5 t/ha. The N:P2Os: K2O mixture (7:10:5) may be applied as basal dose and top dressing at several splits. There is no serious pest or disease incidence in the crop. Average yield is 10-15 kg per plant.

Clove bean *(Ipomoea muricata)*

The crop can be grown throughout the year
and are trailed over trellis or stakes. The seeds @ 6-7 kgfha are planted at a spacing of 1.0 x 0.6 m. FYM is applied at the rate of 10 tfha. N:P2Os:K2O recommendation for the crop is 35:50:25 kgfha. There is no serious pest' or disease incidence in the crop. A verageyield is 5-6 tfha.

Little gourd *(Cocciniagrandis)* .

Local varieties are grown in May-June and September-October by trailing over pandals and stakes.. Stem cuttings with three or four nodes and 30-40 em length, selected from high yielding female vines, are used as planting material. These are planted at a spacing of 4 x 3 m. Farm yard manure at the rate of 25 kg per pit is

given in two doses. No serious pests or diseases are reported except mild attack of fruit flies and gall insects.

Smooth gourd *(Luffa cylindrica)*

Pusa Chickni is the common variety in use. The crop is planted in February-March and May-June at a spacing .of 2 x 2 m. The seed rate is 2.5-3 kgfha. The crop is trailed over pandal, stakes or trellis. FYM at the rate of 25 tfha is given in two doses. N:P2Os:K2O recommended for the crop is 70:25:25 kgiha. No serious pests or diseases are reported. The average yield is 10-15 t/ha.

Ridge gourd *(Luffa acutangula)*

The important varieties are Haritham, Pusa Nasdhar and Co-2. The crop is usually sown during February-March and May-June. Seed rate recommended is 2.5-3.0 kgiha with a spacing of 2 x 2 m. FYM @ 25 t/ha and N:P2Os:K2O @ 70:25:25 kgiha are recommended. It is usually trailed over pandals or trellis. Average yield is 10 to 15 t/ha.

Bell pepper *(Capsicum annuum* var. *grossum)*

Hungarian Wax, California Wonder and Early Calwonder are the promising varieties. Plant the crop during SeptemberOctober at a spacing of 60 x 30 em. The seed rate is 400-600 gfha. Raising of seed

lings, transplanting, irrigation etc. are same as in chilli. FYM at the rate of 25 t/ha and N:P2Os:K2O @ 150:75:50 kglha are to be given. The average yield is 12-15 t/ha.

Drumstick *(Moringa oleifera)*

The major planting season is May-June. Stem cuttings of 1.0-1.5 m length and 15-20 cm girth are used as planting material. Plant the cuttings in polybags and later sprouted cuttings can be sh_fted to main field. For one hectare 62S cuttings are required. These are planteci at a spacing of 4 x 4 m. FYM at the rate of 10-20 kg per pit and N: P2Os:K2O @ 60:80:40 g per pit are recommended. Green caterpillar and hairy caterpillar are the common pests. The average yield is 10-15 kg per tree per year.

Chekkurmanis *(Sauropus androgynus)*

Stem cuttings of 6-12 months old, 20-30 cm length are to be planted in May-June. These are usually grown on borders of kitchen gardens. To check the height of the plant and to get frequent harvests, the tips are clipped off intermittently. FYM at the rate of 5 kg per plant per year and N:P2Os:K2O (7:10:5) mixture @ 30 g per p!ant are recommended. The

average yield is 2-5 *kgl_l* per year.

Indian spinach *(Basella* sp.)

Seeds or _tem cuttings of 20-30 cm length are to be planted during May-June and September-October. The spacing recommended is I m x 0.6 m. These are usually trailed over pandals or stakes. FYM at the rate of 2-5 kglm2 is to be given. The

average yield is 1-2.5 kg/m2.

Water leaf *(Talinum triangulaTe)*

This is a shade loving leafy vegetable grown in May-June and September-October. Semi hard stem cuttings of 10-15 cm length are planted at a spacing of 30 x 10 cm. FYM at the rate of 2-5 kglm2 is given. The average yield is 2.0-2.5 kg/m2. .

Curry leaf *(Murraya koenigii)*

It is usually planted in May-June. Root suckers are used as planting material. The recommended spacing is 4 x 4 m with 625 plants per hectare. FYM atthe rate of 10 kg per plant per year is given. N:P2Os:K2O @ 60:80:40 g per adult plant per year is recommended. Major pests are citrus butterfly and psyllid. *Diaphorina* pink disease is also seen. The average yield is 2-2.5 kg/m2.

Table 25. *Waiting perio ds/or insecticitfes on vegetables*

Vegetable	*Carbaryl*	*F enitrothion*	*Quinalphos*	*Malathion*	*Fenthion*	*Dimethoat e*
Okra	5 days	3 days	3 days	3 days	1 day	3 days
Bitter gourd	11 days	4 days	5 days	4 days	I day	2 days
Brinjal	5 days	4 days	3 days	3 days	1 day	3 days
Snake gourd	5 days	-	6 days	I day	3 days	3 days
Tomato	6 days	5 days	-	1 day	4 days	5 days
Chilli	5 days	8 days	-	I day.	3 days	4 days

Note: Washing vegetables in 2% table salt solution or 2% vinegar and thorough washing in water using scrubber were found to remove residues of contact insecticides.

NON-CHEMICAL CONTROL OF PESTS OF VEGETABLES (Ad hoc recommendations)

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The American serpentine leaf miner is a recently introduced polyphagous pest infesting crops like cucurbits, brinjal, cowpea,

sesame, groundnut and ornamentals. Larvae mine into the leaves and exhibit irregular serpentine like lines. As a result of the at

tack, leaves dry up and cause extensive damage. Spray neem oil emulsion for controlling the pest.

Amaranth leaf webber and grasshopper, okra leaf roller, epilachna beetle on brinjal and bitter gourd, aphids, jassids and mealy bugs on brinjal and okra can be controlled by 4% leaf extracts of neem / thevetia / clerodendron with soap water. Okra fruits can be protected from infestation by fruit borers by spraying
4% leaf extracts of thevetia / neem.

Preparation of plant extract emul$ion

Soak 400 g of leaf powder (leaves dried un
. der shade and powdered) in one litre of water for 24 hours and filter though muslin cloth. Dissolve 400 g of ordinary bar soap shavings in 91itres of water. Pour this soap solution to the plant extract and mix thoroughly. This forms 4% emulsion of plant extract.

TIPS FOR VEGETABLE SEED PRODUCTION

General principles

The seed production programme envisages tQ produce genetically pure quality seeds and to store them in a viable condition for a reasonable period of time, until it reaches the farmers. The seeds should have genetic purity, uniformity in size and shape, high germination and vigour. The seeds should be free from mechanical damages, insect and fungal infestation and other crop and weed seeds. A commercial seed production programme has three aspects - seed production, seed processing and seed storage.

a. *Seed production*

The following aspects are important in this:

I. Basic knowledge on the specific require ment of the crop (climate, soil requirement etc.), specific characteristics of the variety, pests and diseases and their control measures are essential before taking up the seed production programme.

2. In general, September to January is the most suitable season for taking up seed production in Kerala.

3. Site selected for seed production should be open, receiving good sunlight, well drained and fertile soil, free from infectious pest and disease organisms.

4. .Seeds for multiplication should be obtained from reliable sources.

5. Proper jsolation distance should be maintained between varieties and related species.

6. Scientific roguing (removal of off-types at nursery stage, vegetative phase, flowering, fruiting and harvest stages) should be practised.

7. All plants infected by diseases should. be removed from the seed production plot. No objectionable weeds are permitted in seed production plot.

8. In general, for, most vegetable crops, taking one OJ two vegetable harvests is found ideal for economic seed production. '

9. Provide one additional topdressing with Nand K2O at fruit development phase, adequate irrigation and plant protection measures.

10. General cultivation and plant protection practices recommended for vegetable production can be adopted in seed crop also.

II. Harvest the crop at optimum fruit.maturity, since immature and .over mature fruits affect the seed quality.

b. *Seed processing*

1. Seed processing involves extraction of seeds from the fruits and reducing the seed moisture content to a level of 6-8%\

2. Wet and dry methods of seed extraction 1!re adopted depending 6n the nature of the
crop. Slow drying at low temperature (below '38°C) is advisable rather than quick drying at high temperature:

3. Exposing seeds to open sunlight during peak hours of sunshine (12 noon to 3 p.m.) should be avoided. .

4. Spread the seeds in thin layer and give frequent raking for aeration while drying to avoid fungal infestation.

5. Clean the seeds by removing inert matter, damaged and underdeveloped seeds etc. to get uniform quality seeds.

c. *Seed storage*

1. Store seeds under cool andidry conditions to maintain the viability o.

2. Seed moisture content of 6-8%, atmospheric temperature of 22°C and relative humidity of 45% are the most ideal conditions for seed storage. The sum of storage temperature (°C) and humidity (%) should not exceed 80.

3. Pre-storage seed treatment with fungi
cides (captan or thiram @ 2.5 g *I* kg of seeds) and insecticides (carbaryl 10% D @ 10 *g/kg* or lindane 5<yo D @ 20 *g/kg)* would protect the seeds from various fungal and insect infestations. .

4. Store the treated seeds in 700 gauge poly thene bags in sealed conditions.

Specific recommendations for seed production of the individual crops other than the general aspects mentioned above are given below:

Solanaceous vegetables

Tomato

The best time for planting tomato for seed production is October. Give an isolation

distance of 50 m for foundation seed (FS) production and 25 m for certified seed (CS)

between varieties. Rogue out off-types and virus infected plants. Maximum off-types and diseased plants permitted is 0.1 % each only. Seeds should have a minimum purity of98% and germination of70%. Maximum permitted inert matter content .is 2%, other crop seeds 0.1%, weed seeds 0.1%, and maximum moisture content 8%.

Brinjal

Give an isolation distance of 200 m for FS and 100 for CS. Remove off-types and plants infected by little leaf qisease. No objectionable weeds are permitted in the seed production plot. Maximum level of offtypes and plants infested by designated diseases are 0.1 % each. Seeds should have a minimum purity of 98% and germination of
70%. Maximum inert matter content permitted is 2%, other crop seeds 0.1 %, weed seeds 0.1 % and maximum moisture content 8%.

Chilli

Provide an isolation distance of 400 m for FS and 200 m for CS. Remove off-types and plants infected by virus diseases. No objectionable weeds are pem1itted in the seed production plot. Maximum level of off-types and plants infested by designated diseases are 0.1 % each. Fruits of 45-50 days maturity may be harvested for seed extraction in the case of Jwalasakhi and Ujwala. Seeds should have a minimum purity of 98% and germination of 70%; maximum inert matter content permitted is 2%, other crop seeds 0.1 %, weed seeds 0.1 %; and maximum moisture content 8%.

Okra

Provide an isolation distance of 400 m for FS .
and 200 m for CS. Remove off-types and plants infected by yellow vein mosaic disease. No objectionable weeds are permitted in the seed production plot. Maximum level of off-types and plants infected by yellow vein mosaic is 0.1 % each. It is economical to take two vegetable harvests and then retain

the crop for seed production. Fruits of 36 days maturity may be harvested for seed extraction in the case of Arka Anamika. At this stage the pod colour completely turns to brown and tips dry. Seeds can be stored in polythene bags of 700 gauge thickness.

Seeds should have a mmlJllum purity of 99% and germination of 65%. Maximum inert matter content permitted is 1 %; no seeds of other crops or weeds are permitted; and maximum moisture content permitted for open storage is 10% and for storing in moisture proof containers is 8%.

Cucurbits General

An isolation distance of 800 m for FS and 400 m for CS is required between varieties and related species. Remove off-types, wild cucurbits and plants" infected by designated diseases. No objectionable weeds are permitted in the seed production plot. Maximum level of off-types and plants infected by yellow vein mosaic diseases

is 0.1 % each. Seeds should have a minimum purity of 99% and germination of 60%. Maximum inert matter content permitted is 1 %. No seeds of other crops or weeds are permitted and maximum moisture content should not exceed 7%.

Bitter gourd

Taking two vegetable harvests and then leaving the crop for seed production is economical. Ripe fruits of 24 days maturity in Preethi, when the whole fruits turn to bright orange colour, can be harvested for seed extraction. Seeds may be dried in the sun, avoiding peak sunshine hours of 12 noon to 3 p.m. Seeds can be stored in 700 gauge thick polythene bags.

Snake gourd

Fruits can be harvested for seed extraction 36 days after anthesis (in T A 19), when yellowing of fruits start from the stylar end.

Big and medium sized fruits (above 85 cm length and 2 kg weight in Kaumudi) give maximum quantity of quality seeds.

Oriental pickling melon

Harvest fully ripe fruits with deep orange colour (30 days after anthesis in Mudicode Local), when the vines wither. Select big and medium sized fruits (above 1.25 kg in Mudicode Local) for quality seeds.

Ash gourd

Ash gourd fruits of 70 days maturity after anthesis are suitable for seed extraction. At this stage the vines wither; and the sticky thick ashy coating on the fruits dries into white powder, which can be removed on rubbing. Fruits of medium and large size (above 5 kg in KAU Local) give bolder, quality seeds. It is advisable to have a postharvest storage of fruits for three months to get higher germination. Manual extraction of pulp from the fruits and fermenting the pulp for 48 hours is better to get quality seeds without mechanical damage. Prestorage treatment of seeds with captan @ 2.5 g/kgand storing in sealed polythene bags of 700 gauge thickness is the best for seed storage.

Vegetable cowpea

Dried pods can be harvested for seed purpose. These pods are further dried in the sun before seed extraction. Good drying and pre-storage seed treatment of seeds (with carbaryl 10% D @ 109 / kg seeds or lindane 5% D @ 20 g / kg seed and - thiram or captan @ 2.5 g / kg seed) is essential to protect them from *Bruchus* and fungal infestations.

Amaranth

It is economical to take one vegetable harvest at 30 days after planting and then

leaving the crop for seed production.