Package of Practices (PoP) for Vegetable cultivation in Andaman and Nicobar Islands 2014

Cauliflower

(*Brassica oleracea* var. *botrytis* L.)

Season	Open cultivation in Dry season (Dec. – April) and Rain shelter cultivation in rainy season (May-Nov.)
Variety	White Marble, White Shot, Best Early, Early Kunwari, Pusa Meghna
Soil	Well drained organically rich sandy loam soils, light soils hasten maturity
Sowing time	Staggered sowing at monthly interval is advisable. Dry season crop: November to January months Rainy season crop: May to September months
Seed rate	400 - 450 g /ha; 10 beds of 7 m length x 1 m width for one hectare area
Nursery management	Select well drained open space. Make the soil fine tilth and mix 10 kg FYM or 5 kg vermicompost per square meter. Raise beds (1 m width and 5-7 m length) to 20 -30 cm with proper drainage facility. Seedlings can be produced in Pro-trays. Ensure seed treatment with Bavistin or Thiram @2g/kg of seed. Sowing should be done in 5 cm apart lines and at a depth of 1 -2 cm. The lines should be closed with fine FYM. After sowing the seed, cover beds with dry grass or rice straw till germination for rapid and good germination. Regular watering, drainage and disease - pest management should be done. Keep the nursery protection shelter in 'ready to use mode' to avoid damage from heavy rains. Irrigate nursery on alternate day during last week for hardening of seedlings.
Spacing	Single row: 50 cm X 30-40 cm; Double row bed system: 60 cm (40 cm x 30 cm) + 50 cm (between beds)
Transplanting	Transplant4-5 weeks old seedlings on raised beds. Make 8-10 cm pit at prescribed distance and apply mixture of recommended dose of FYM, DAP, MOP and close half of pit. Seedlings should be planted in remaining half pit in evening hours. Ensure proper watering after planting.
Irrigation	Frequent irrigation needed in initial days, later on it can be done at 3 days interval. Furrow or drip irrigation is better. Mulching with plastic, dry grass, rice straw is suggested.
Intercultural operations	Weeding and hoeing at 10-15 days interval are necessary. Avoid damage to leaves during field activities. Spray micronutrients for better growth and yield.
Manuring	20 t/ha
Fertiliser	Apply 60kg Nitrogen, 80 kg Phosphorus, and 60 kg Potassium per hectare as basal dose. Apply the remaining 30 kg N/ha after 30 -35 days of planting.
Disease and its control	Avoid damage to curd from heavy rains to protect from curd rot and spray copper oxychloride(0.3%) to minimize curd rot incidence. Use net house for avoid pest attack. Grow maize as barrier crop, mustard as trap crop. Spray Neem formulations; spray monocrotophos or cypermethrin @ 1 ml / litre of water at 15 days interval. Use light traps and pheromone traps.
Rain sheltered technology	Developed to grow White Marble and White Shot varieties of cauliflower in rain shelters in rainy season. It protects crop at curding stage from heavy rains.
Potted cauliflower technology	Developed to grow cauliflower in roof top, stairs, kitchen gardens in Peri-urban areas and area with problem soils. It provides bags with suitable growing media (Cocopith + Vermicompost+soil), variety (White Marble, White Shot) and pitcher or drip irrigation system.
Harvesting	Curds are ready for harvest after 80 to 90 days of transplanting
Yield (q /ha)	150 – 300 depending on variety and crop season

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Cabbage

(*Brassica oleracea* var. *capitata* L.)

Season	Open cultivation in Dry season (Dec. – April)
Variety	NS-43, Green Express, Rear Ball, Pusa Ageti
Soil	Well drained organically rich sandy loam soils, light soils hasten maturity
Sowing time	Staggered sowing at monthly interval is advisable during November to January months
Seed rate	400 - 450 g /ha; 10 beds of 7 m length x 1 m width for one hectare area
Nursery management	Select well drained open space. Make the soil fine tilth and mix 10 kg FYM or 5 kg vermicompost per square meter. Raise beds (1 m width and 5-7 m length) to 20 -30 cm with proper drainage facility. Seedlings can be produced in Pro-trays. Ensure seed treatment with Bavistin or Thiram @2g/kg of seed. Sowing should be done in 5 cm apart lines and at a depth of 1 -2 cm. The lines should be closed with fine FYM. After sowing the seed, cover beds with dry grass or rice straw till germination for rapid and good germination. Regular watering, drainage and disease - pest management should be done. Keep the nursery protection shelter in 'ready to use mode' to avoid damage from heavy rains. Irrigate nursery on alternate day during last week for hardening of seedlings.
Spacing	Single row: 40 cm X 30 cm; Double row bed system: 60 cm (40 cm x 30 cm) + 40 cm (between beds)
Transplanting	Transplant 4-5 weeks old seedlings on raised beds. Make 8-10 cm pit at prescribed distance and apply mixture of recommended dose of FYM, DAP, MOP and close half of pit. Seedlings should be planted in remaining half pit in evening hours. Ensure watering after planting.
Irrigation	Frequent irrigation needed in initial days, later on it can be done at 3 days interval. Furrow or drip irrigation is better. Mulching with plastic, dry grass, rice straw is suggested.
Intercultural operations	Weeding and hoeing at 10-15 days interval are necessary. Avoid damage to leaves while field practices. Spray micronutrients mixture for better growth and fruiting.
Manuring	20 t/ha
Fertiliser	Apply 60kg Nitrogen, 80 kg Phosphorus, and 60 kg Potassium per hectare as basal dose. Apply the remaining 30 kg N/ha after 30 -35 days of planting.
Disease and its control	Use net house for avoid pest attack. Grow maize as barrier crop, mustard as trap crop. Spray Neem formulations; spray monocrotophos or cypermethrin @ 1 ml / litre of water at 15 days interval. Use light traps and pheromone traps.
Potted cabbage technology	Developed to grow cabbage in roof tops, stairs, kitchen gardens in Peri-urban areas and area with problem soils. It provides bags with suitable growing media (Cocopith + Vermicompost+soil), variety (Ns-43, Green Express) and pitcher or drip irrigation system.
Harvesting	Heads are ready for harvest after 80 to 90 days of transplanting
Yield	150 – 300 q/ha; depending on variety and crop season

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Knolkhol

(*Brassica oleracea* var. *gongylodes*)

Season	Open cultivation in Dry season (Dec. – March)
Variety	Super Star, White Vienna, Early White Vienna
Soil	Well drained organically rich sandy loam soils, light soils hasten maturity
Sowing time	Staggered sowing at 10-15 days interval is advisable during November to January months
Seed rate	600 - 800 g /ha; 15 beds of 7 m length x 1 m width for one hectare area
Nursery management	Select well drained open space. Make the soil fine tilth and mix 10 kg FYM or 5 kg vermicompost per square meter. Raise beds (1 m width and 5-7 m length) to 20 -30 cm with proper drainage facility. Seedlings can be produced in Pro-trays. Ensure seed treatment with Bavistin or Thiram @2g/kg of seed. Sowing should be done in 5 cm apart lines and at a depth of 1 -2 cm. The lines should be closed with fine FYM. After sowing the seed, cover beds with dry grass or rice straw till germination for rapid and good germination. Regular watering, drainage and disease - pest management should be done. Keep the nursery protection shelter in 'ready to use mode' to avoid damage from heavy rains. Irrigate nursery on alternate day during last week for proper hardening of seedlings.
Spacing	Single row: 30 -40 cm X 20-25 cm Double row bed system: 60 cm (40 cm x 25 cm) + 40 cm (between beds)
Transplanting	Transplant 4-5 weeks old seedlings on raised beds. Make 8-10 cm pit at prescribed distance and apply mixture of recommended dose of FYM, DAP, MOP and close half of pit. Seedlings should be planted in remaining half pit in evening hours. Give water immediate after planting.
Irrigation	Frequent irrigation needed in initial days, later on it can be done at 3 days interval. Furrow or drip irrigation is better. Mulching with plastic, dry grass, rice straw is suggested for good quality knobs.
Intercultural operations	Weeding at 10-15 days interval is necessary. Avoid damage to leaves while field practices
Manuring	20 t/ha
Fertiliser	Apply 40kg Nitrogen, 80 kg Phosphorus, and 60 kg Potassium per hectare as basal dose. Apply the remaining 40 kg N/ha after 30 -35 days of planting.
Disease and its control	Use net house for avoid pest attack. Grow maize as barrier crop, mustard as trap crop. Spray Neem formulations; spray monocrotophos or cypermethrin @ 1 ml / litre of water at 15 days interval. Use light traps and pheromone traps.
Harvesting	Knobsor tubers are ready for harvest after 50 to 60 days of transplanting when they attain 6-8 cm size.
Yield	100 – 150 q/ha; depending on variety and crop season
Potted knolkhol technology	Developed to grow knolkhol in roof tops, stairs, kitchen gardens and area with problem soils. It provides bags with suitable growing media (Cocopith + Vermicompost+soil), variety (Super Star) and pitcher or drip irrigation system.

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Broccoli

(*Brassica oleracea* var. *italica*)

Season	Cool season crop, so grow well in December – February months but protection is required from heavy rains during bud stage.
Variety	Pusa Broccoli Kt Sel 1, Palam Samridhi, Punjab Broccoli 1, Spartan.
soil	Well drained organically rich sandy loam to clay loam soils, pH 5.5-6.5 with better water retention capacity gives better yield.
Sowing time	Mid October – November (staggered planting)
Seed rate	300-400 g /ha
Nursery management	Prepare 20 -30 cm raised nursery bed and mix 10 kg FYM or 5 kg vermicompost per square meter. The beds should be 1 m wide and of 5-7 m length. Treat the beds by drenching with Bavistin or Thiram @2g/lt. The sowing should be done in 5 cm apart lines and at a depth of 1 -2 cm. Cover beds with dry grass or rice straw for 2-3 days help in germination. Regular watering, drainage and disease - pest management should be done. Provide net-house for pest protection and rainshelter from heavy rains. Hardening of the seedlings help in better crop establishment.
Spacing	Single row: 40 cm X 30 cm; Double row bed system: 60 cm (40 cm x 30 cm) + 40 cm (between beds)
Transplanting	Seedlings are ready for transplanting after 30 – 35 days of sowing. The field should be prepared well by 2-3 ploughing. Mix FYM at first ploughing and recommended doses of N, P and K at last ploughing. Prepare the raised beds of 10-15 cm height and transplanting should be done on both sides of the bed. Evening hours are better for transplanting and immediate irrigation is required for better crop establishment.
Irrigation	Regular irrigation at 3-5 days interval is good for better crop growth. The interval should be 2-3 days during head development. The furrow or drip irrigation is better. Mulching with plastic, dry grass and rice straw help in better retention of soil moisture and improve crop yield.
Intercultural operations	Weeding at 10-15 days interval is necessary. Removal of diseased leaves. The hoeing should be done at 30 and 45 days after transplanting.
Manuring	20 t/ha
Fertiliser	Apply 100 kg Nitrogen, 60 kg Phosphorus, and 30 kg Potassium per hectare. Half of N and full of P and K should be given as basal dose while remaining half at 30 days after transplanting.
Disease and its control	Damping off causes serious damage in nursery and it can be controlled with Bavistin @ 2g/ lt and Mancozeb @ 0.2% at 10-15 days interval. Downy mildew and Sclerotinia rot are also observed and Dithane M45 @0.2g/ lt at 10 days interval is suggested for its effective control.
Harvesting	The heads are ready after 70 -80 days of transplanting. The central head is removed along with 15 cm long fleshy stem. The new head shoots will sprout from sides which can be harvested at 10-12 days interval. It is better to harvest head early than late otherwise heads will become loose and bud will open which affect quality and consumer preference.
Yield	60 – 80 quintals/ha

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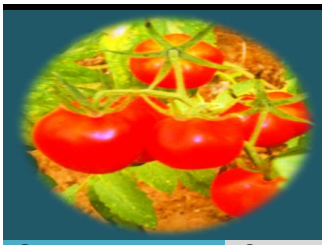

Tomato

(*Solanum lycopersicum* Syn. *Lycopersicon esculentum* L.)

Season	Open cultivation in Dry season (Dec. – April) Protected cultivation in rainy season (May-December)
Variety	Arka Vikas, Ayush, Arka Samrat, Arka Rakshak, BT-10, BT-1
Soil	Well drained, organically rich and good water holding capacity soils are good. Suitable soils for early harvesting are sandy loam soils while high yield can be obtained from heavy and organically rich heavy texture soils with pH 6.0-7.0.
Sowing time	For open cultivation in Dry season –Early – (October); Main (November – December) and Late (January). For protected cultivation in rainy season: Early crop (April – May), Main crop (June); Late crop (July-August)
Seed rate	300 - 350 g /ha; 10 beds of 7 m length x 1 m width for one hectare area
Nursery management	Select well drained open space. Make the soil fine tilth and mix 10 kg FYM or 5 kg/ sq. m vermicompost. Raise beds (1 m width and 5-7 m length) to 20 -30 cm with drainage facility. Seedlings can be produced in Pro-trays technique. Treat seeds with Bavistin or Thiram @2g/kg of seed. Sowing should be done at 5 cm apart lines at a depth of 1 -2 cm. Close lines with fine FYM and cover beds with dry grass till germination. Regular watering, drainage and disease - pest management should be done. Protect nursery by shelter to avoid damage from heavy rains.
Spacing	Single row: 50 -60 cm X 40-50 cm Double row bed system: 80 -100 cm (60 cm x 40 cm) + 50 cm (between beds)
Transplanting	Transplant 4 weeks old seedlings on raised beds (one seedling/hill) Make 8-10 cm pit at prescribed distance and apply mixture of recommended dose of FYM, DAP, MOP and fill half of pit by soil. Seedlings should be planted in remaining half portion of the pit. Transplanting should be done in evening hours and proper watering should be done immediate after planting.
Irrigation	Frequent irrigation needed in initial days, later on it can be done at 3 days interval. Furrow or drip irrigation is better. Mulching with plastic, dry grass, rice straw is suggested for good quality fruits.
Intercultural operations	Weeding and hoeing at 10-15 days interval is necessary. Avoid damage to plant stem or roots while field practices. Spray micronutrients mixture for better growth and fruiting.
Manuring Fertiliser	20 -25 t/ha Apply 30kg Nitrogen, 50 kg Phosphorus, and 50 kg Potassium per hectare as basal dose. Apply two doses of 30 kg N/ha each at 30 and 50 days of planting and phosphorus @ 30 kg/ha at 30 days after planting.
Disease and its control	For pest management use maize as barrier crop, marigold as trap crop, spray neem formulations; monocrotophos or cypermethrin @ 1 ml / litre at 15 days interval. For wilt management in polyhouse, use resistant varieties, modified growing media (coconut pith+vermicompost+lime), grafting technique
Harvesting	Harvest red to pink stage fruits for transport or local markets
Yield	200 – 250 q/ha
Potted tomato technology	Developed to grow tomato in roof tops, stairs, kitchen gardens and area with problem soils. It provides bags with suitable growing media (Cocopith + Vermicompost+soil), variety (Ayush, Arka Samrat, Arka Vikash).

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Brinjal (*Solanum melongena* L.)

Season	Main crop: Dry season (December – May) Off-season: Rainy season (May-December)
Variety	CARI Brinjal-1, Arka Nidhi, Pusa Purple Long, Pusa Purple Cluster, Pusa Kranti, Punjab Sadabahar, PB-54
Soil	Well drained, fertile, deep and good water holding capacity soils are good. Light soils are good for early crop and clay loam or silty soils for high yield. Soil pH should be 5.5 to 6.0
Sowing time	Dry season crop –October-November Rainy season crop: April (with irrigation facility) – May (Rainfed crop)
Seed rate	250 - 300 g /ha; 5 beds of 7 m length x 1 m width for one hectare area
Nursery management	Select well drained open space. Make the soil fine tilth and mix 10 kg FYM or 5 kg vermicompost per sq meter. Prepare raise beds of 1 m width and 5-7 m length with drainage facility. Seedlings can be produced in Pro-trays technique. Sowing should be done in 5 cm apart lines at a depth of 1 -2 cm and spread FYM. Cover beds with dry grass till germination. Provide shelter to avoid damage from heavy rains.
Spacing	Single row: 70 -80 cm X 50-60 cm Double row bed system: 100 cm (80 cm x 60 cm) + 80 cm (between beds)
Transplanting	Transplant 5-6 weeks old seedlings on raised beds (one seedling/hill). Make pit and apply mixture of FYM, DAP, MOP and fill it by half. Plant seedlings in pit in evening hours. Proper watering should be done immediate after planting.
Irrigation	Frequent irrigation needed in initial days, later on it can be done at 5-7 days interval. Furrow or drip irrigation is better. Mulching with dry grass and rice straw is suggested for good quality fruits.
Intercultural operations	Weeding and hoeing at 15 -20 days interval is necessary. Remove wilted plants and borer affected parts/fruits while field practices.
Manuring	20 -25 t/ha
Fertiliser	Apply 40kg Nitrogen, 50 kg Phosphorus, and 60 kg Potassium per hectare as basal dose. Apply two doses of 40 kg N/ha each at 30 and 50 days of planting and phosphorus @ 40 kg/ha at 30 days after planting.
Disease and its control	For pest management use maize as barrier crop, marigold as trap crop, spray neem formulations; cypermethrin @ 1 ml / litre at 15 days interval. For wilt management in polyhouse, use resistant varieties, modified growing media (coconut pith+vermicompost+lime), grafting on resistant stock.
Harvesting	Harvest fruits of good size and bright glossy colour. Test fruit maturity by pressing front of fruits, it is immature if it springe back to original shape.
Yield	200 – 350 q/ha
Net house technology	Net house cultivation technology developed for production of pest free brinjal crop with minimum use of pesticides.

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Chilli (*Capsicum annum* L.)

Season	Main crop: Dry season (December – May) Off-season: Rainy season (May-December)
Variety	KA-2, LCA-334, Pusa Jwala, Local
Soil	Well drained, fertile, loam, deep and good water holding capacity soils are good. Light soils are good for early crop and better quality fruits while clay loam or silty soils are for high yield. Soil pH should be 5.5 to 6.0
Sowing time	Dry season crop – October-November Rainy season crop: April (with irrigation facility) – May (Rain fed crop)
Seed rate	500 g to 1 kg/ha; 12-15 beds of 3 m length x 1 m width for one hectare area (40-50 sq. meter area)
Nursery management	The nursery beds should be made in a well drained open space. Mix 10 kg FYM or 5 kg vermicompost per sq meter and prepare 15-20 cm raise beds of 1 m width and 3 -7 m length with drainage facility. Sowing should be done in 5 cm apart lines at a depth of 1 - 2 cm. Cover the line with powdered FYM. The seedlings can be produced in Pro-tray technique in which the plugs are filled with vemicompost and coco pith (1:1) mixture. The nursery should be provided with 45 mesh nylon net to avoid pest damage and plastic shelter to avoid damage from heavy rains. Clipping of seedlings 7-10 days prior to planting help in better establishment and profuse branching. Seedling are ready for transplanting in 35-42 days from beds and 25-30 days in trays.
Spacing	Single row planting: 50 cm X 30-40 cm Double row bed system: 60 cm (40 cm x 20 cm) + 40 cm (between beds)
Transplanting	Transplant 6-7 weeks old seedlings on raised beds (one seedling/hill). Field should be ploughed well and mix FYM during first ploughing while half of N and full of P and K should be applied at last ploughing. The planting of well grown healthy seedlings should be done in evening hours and proper watering should be done immediate after planting.
Irrigation	Frequent irrigation is needed in initial days while interval can be extended to 3-5 days after crop establishment. Furrow or drip irrigation is better. The mulching with dry grass and rice straw is suggested for moisture conservation, weed control and higher fruit yield.
Intercultural operations	Gap filling should be done from pro-tray seedlings just after observing such gaps. Weeding and hoeing should be done at 10 days interval during rainy season while 15-20 days during dry season. Remove wilted plants and virus infected portion of parts which help in reducing the spread of diseases. Pinch the apical buds at 40 to 45 days after planting for profuse branching.
Manuring Fertiliser	20-25 t/ha Apply 30kg Nitrogen, 50 kg Phosphorus, and 60 kg Potassium per hectare as basal dose. Apply two doses of N @ 30 kg/ha at 30 and 60 days after planting.
Disease and its control	The leaf curl, bacterial wilt and anthracnose are the major problems in the chilli in islands. Spary Emidacloprid @ 0.5-1 ml/lt or neem formulations or monocrotophos or cypermethrin @ 1 ml / litre at 15 days interval for control of white fly and thrips which also control virus transmission. Use resistant varieties, Trichoderma, lime, copper oxichloride, modified growing media (coconut pith+vermicompost+lime) help in wilt management.
Harvesting	Picking of green fruits at 10-12 days interval.
Yield	80 – 120 quintals/ha

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Sweet pepper

(*Capsicum annuum* var. *grossum*)

Season	It grows well in rainy season (May-December) and early dry season (November - March) in polyhouse. Not suitable for open cultivation.
Variety	Green: Indra, California Wonder, Arka Gaurav; and Yellow: Orobelle
Soil	Well drained, fertile, loam, deep and good water holding capacity soils are good. Clay loam or silty soils are good for high yield.
Sowing time	For rainy season crop : April-May and Early dry season crop : October month
Seed rate	450 - 500 g /ha; 12-15 beds of 3 -5 m length x 1 m width for one hectare area (40-50 sq meter area) or around 350 pro-trays (96 plugs size).
Nursery management	The capsicum nursery should be made in portrays for higher recovery of healthy plants, better crop establishment and early production of seedlings. For this, the pro-trays should be filled with a mixture of cocopith and vermicompost in 1:1 ratio. One seeds should be placed in each plug. Keep the tray in a partial shade and rain protected condition during initial 2-3 days for early germination. Later, place the tray in a partial shade condition and provide regular watering. Apply a 2 % nutrient solution at 15 days after sowing. Provide Insect Proof Net to protect from pest and rainshelter from heavy rains. Capsicum also needs hardening for better field stand.
Spacing	Single row: 60 cm X 50 cm Double row bed system: 80 cm (60 cm x 40 cm) + 40 cm (between beds)
Transplanting	Transplant the 5-6 weeks old seedlings on raised beds (one seedling/hill). For this, the field should be well ploughed and mix FYM at first ploughing while N, P and K at the time of last ploughing. Prepare the 80 cm wide raised beds (15 cm) at 40 cm interval. Plastic mulch can be used at this stage. Make small holes and apply small amount of vermicompost of FYM for better crop establishment. The seedlings should be planted in the holes in evening hours and watering near plants should be done immediate after transplanting.
Irrigation	Frequent irrigation near the plants and in the furrow is needed in initial days. Later on the irrigation can be done in furrows at 3-5 days interval. However, it is better to provide drip irrigation at regular interval for better growth and yield. The mulching with dry grass and rice straw is suggested for moisture conservation, weed control and higher fruit yield.
Intercultural operations	The weeding near the plants grown with mulching and no-mulching plots should always be free from weeds. Wilted plants or mites infected parts should be removed to check their spread. Perform training for proper frame and pruning of initial flowers to maximize yield and quality of fruits.
Manuring	20 – 25 t/ha
Fertiliser	Apply 60kg Nitrogen, 80 kg Phosphorus, and 80 kg Potassium per hectare as basal dose. Apply additional dose of N @ 30 kg/ha at 30, 60 and 90 days after planting. It is better to provide P and K in splits with N with irrigation water.
Disease and its control	Bacterial wilt, mites and thrips are major problem in capsicum in islands. The wilt can be controlled by use of moderate resistant variety (Arka Gaurav), grafting on wilt resistant stock, growing media (coco pith+ + soil + vermicompost+ lime in 1:1:1:0.01 ratio) and use of copper oxichloride 2g/lt. The mite is big problem and its control can be done by neem formulations; imidacloprid @ 0.5-1.0 ml/lt or cypermethrin @ 1 ml / litre at 10 - 15 days interval. Proper management of polyhouse structures help in mites control.
Harvesting	The fruits are ready for harvesting at 90-100 days of transplanting. Harvest fully grown mature (green for green colour varieties; yellow for yellow coloured and red for red coloured capsicum).
Yield	250 – 300 q/ha

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Okra (*Abelmoschus esculentus*)

Season	Round the year cultivation and only 90- 100 days duration crop. May- September (early crop), August- December (main rainy season), December – April (dry season)
Variety	Arka Anamika, HOK-152, Prabhani Kranti, Hybrids
Soil	Well drained deep and nutrient rich soils are ideal.
Sowing time	May- June (early crop), August- September (main rainy season crop), December – January (Main dry season crop)
Seed rate	7.5- 8.0 kg/ha
Nursery management	Not required but for gap filling the seedlings can be produced in 'Pro-trays' or for May month planting when water become a critical factor for early stage crop.
Spacing	Open pollinated varieties: 60 x 30 - 40 cm for rainy season and 60 x 50 cm for dry season crop For Hybrids: 70-80 x 50- 60 cm for both seasons
Land preparation	Apply the FYM and mix by first ploughing 15 days prior to sowing. After 10 days perform next ploughing and last ploughing should be done 2-3 days prior to sowing. The half dose of N and full dose of P and K should be mixed in the soil at the time of last ploughing.
Sowing and Transplanting	The line sowing at prescribed spacing level should be done. For contingency crop or gap filling, the seedlings with root ball from portrays should be transplanted in the gaps. This transplanting technique is suitable for heavy rainy season when seed germination in field is difficult due to excess soil moisture or water logging.
Irrigation	During dry season, irrigate the crop at 3 to 4 days at vegetative stage while 2 to 3 days interval at flowering and fruiting stage. Use of dry grass mulch help in conservation of soil moisture and reduce weed infestation.
Intercultural operations	Weeding and hoeing at 10 -15 days interval is necessary. Hoeing at 30 and 45 days helps in improving soil aeration and plant growth. Remove yellow vein mosaic infected plants from field. Spray micronutrients mixture for better growth and fruiting.
Manuring	Apply well decomposed FYM or compost as basal dose @ 20 t/ha.
Fertiliser	At the time of sowing, apply N, P, and K @ 40, 50 and 50 kg/ha. Additional 40 kg N per ha may be applied after 30 and 50 days.
Disease and its control	The important pests are jassids, fruit and shoot borer and root knot nematode. Against jassids and white fly useImidacloprid or dimethoate 3-5 ml/ 10 ltas foliar sprays. For controlling fruit and shoot borers, remove all drooping shoots and damaged fruits. Spray carbaryl @ 5 ml/10 lit at intervals of 10 to 20 days. For controlling aphids, apply 0.05%.
Harvesting	Start harvesting after 45 days of sowing when fruits are tender. A total number of 10-15 harvests can be made.
Yield	9-15 t/ha

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Cucurbits: Bitter gourd, cucumber, ridge & sponge gourd, bottle gourd, pumpkin, Ash gourd watermelon, Muskmelon, kakrol, pointed gourd,

Season	Suitable for round the year cultivation Main crop Season: December – April (dry season crop)
Variety	Bottle gourd : Pusa Naveen, Arka Bahar, Pusa Sandesh Bitter gourd : Pusa Do Mausami, Arka Harit, Pusa Vishesh, CO-1, Sponge gourd: Pusa Supriya, Pusa Chikni, Hybrids Ridge gourd : Pusa Nasdar, CO-1, CO-2, Arka Sumeet, Arka Sujat Cucumber : Japanese Green Long, Priya, Pusa Sanyog Snake gourd : Coimbatore Long CO-1, CO-3, CO-4 Ash gourd : CO-1, CO-2, Local Pumpkin : Arka Suryamukhi, Arka Chandan, CO-1, CO-2, Pusa Vikas Watermelon : Arka Jyoti, Pusa Bedana, Arka Manik Muskmelon : Pusa Rasraj, Hara Madhu, Arka Rajhans, Arka Jeet Kakrol : CARI- Kakrol, Local types Parwal : Local types
Soil	Well drained deep and rich to medium in nutrient soils are ideal.
Sowing time	May- June for rainy season crop), December –January (Main dry season crop)

Seed rate and Spacing

Crop	Seed (kg/ha)	Row to Row(m)	Pit to pit (m)
Bitter gourd	7.5- 8.0	1.5-2.5	0.60-1.0
Bottle gourd	4.0	2.0-3.0	1.0-1.2
Cucumber	3.0	1.5-2.0	0.60-1.0
Sponge gourd	4.0	1.5-2.5	0.6-1.0
Ridge gourd	4.0	1.5-2.5	0.6-1.0
Snake gourd	4.0	2.5-3.0	0.6-1.0
Wax gourd	7.50	2.5-3.0	0.6-1.2
Muskmelon	2.5-3.0	1.5-2.5	0.6-1.0
Watermelon	3.5-5.0	2.5-3.0	0.9-1.2

Planting system	Dioceous cucurbits like kakrol and parwal are planted in 9:1 system. Here, after nine (9) rows of female plants one (1) row of male plant was planted as pollen source. The artificial pollination should be done for fruit setting. This can be done by pollen brush, spray or flower touch method.
Sowing	Grown as direct seeded crop. Sow the seeds at recommended spacing by making small hill or basins on raised beds. Three to four seeds should be at one basin or hill. After sowing the basin or hill should be covered with banana or arecanut or coconut or dry grass for better germination of the seeds. This helps in conserving moisture and protection of germinating seeds from extreme heat strokes. The cucurbits can be grown in problematic soils by making small basins or raised hills of 30 x 30 x 30 cm size. It should be encircled and provided mulch with coconut husk which keep moisture in favour of crop and also keep the hill intact even in heavy rains. Provide proper drainage to all the basin or hills otherwise water logging or water stagnation during heavy rains damage vines or plants.

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Nursery and Transplanting	It is suggested to grow cucurbits by seedling method during contingency situations. For this the 'Pro-trays' technique is ideal. The seedlings with root ball should be planted at prescribed spacing level on raised hills or basins.
Irrigation	During dry season, irrigate the crop at 4 to 5 days at vegetative stage while 3 to 4 days interval at flowering and fruiting stage.
Training and pruning	Support system of bamboo-sticks or *pandal* system should be provided for high yield and fruit quality. It protects vines from losses due to water stagnation. Bed-wise *pandal* is easy to prepare and manage the crop.
Intercultural operations	Weeding and hoeing at 10 -15 days interval is necessary. Remove diseased/pest infected leaves from field. Spray micronutrients mixture for better growth and fruiting.
Manuring	Apply FYM or compost as basal dose @ 15-20 t/ha. The FYM should be provided in the hills or basins for efficient use of the nutrients.
Fertiliser	50-100 kg N, 60 kg P_2O_5 and 60 kg K_2O/ha. An application of Ca (20-30ppm) and Boron (7.5-10ppm) promotes plant growth, increases fruit yield, flesh yield and rind thickness.
Disease and its control	Powdery mildew, downy mildew, anthracnose, fusarium wilt, alternaria blight diseases are common. Their control is possible with use of suitable varieties, fungicides like any of the Carbandazim (0.1%), Copper oxychloride (2%), Bavistin (0.1%), Dithane M-45 (0.2%), Borax wash (2.5%) at 7 days interval. Viral diseases can be controlled by managing vectors like white fly and aphid. Red pumpkin beetle, aphids, fruit fly and mites are common pest in islands. Spray Carbaryl (0.1-0.2%) or Rogor (0.1%) for RPB; Rogor (0.1-0.2%) or ImpidaclopridorMetasystox(0.1-0.2%) for aphid and white fly. For Fry fly control spray Ednosulphan or Thiodan @6ml/4.5lt water. Daizinon 0.03% or Labaycid 0.05% are found effective against mites.
Yield	

Crop	Day to harvest after sowing	Potential Yield	Avg. Productivity (t/ha)
Bitter gourd	55-100	12-15 t/ha	3.3
Bottle gourd	60-100	15-20 t/ha	8.8
Cucumber	60-70	15-20 t/ha	5.0
Sponge gourd	60-90	8-12 t/ha	6.0
Ridge gourd	55-80	8-12 t/ha	4.5
Snake gourd	60-70	8-10 t/ha	6.0
Wax gourd	60-80	10-15 t/ha	8.0
Muskmelon	100-110	12-25 t/ha	4.0
Watermelon	110-120	30-40 t/ha	7.2

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Cowpea

(*Vigna unguiculata* subsp. *sesquipedalis*)

Season	Suitable for round the year cultivation Main crop Season: December – April (dry season crop)
Variety	Pusa Phalguni, Pusa Do Fasali, Pusa Komal, Arka Suman, Arka Garima **Pole type** -Arka Sumangal, Yard long bean (Local)
Soil	It can be grown in all types of soil. It does not thrive well in highly acidic or alkaline soil. Favourable range of soil pH is between6.0-7.5.
Sowing time	Dry season: December – March; one month interval Rainy season: May- June or rain-free days during September month
Seed rate	Bush type – 20 – 25 kg/ha Pole type – 10 - 12kg/ha
Soil preparation	The soil is prepared by ploughing 2 to 3 times and then levelling by planking. Raised beds and double row system should be practiced for higher yield and less labour requirement.
Spacing	Bush type - 10 – 15 cm distance on the ridges at 50 – 60 cm apart. Pole type -Prepare 80 – 90 cm beds at 50 cm apart. Sowing should be done in row in rows at 60 cm apart and seed to seed distance should be 20 – 25 cm. Raised bed with double rows is better option for islands.
Irrigation	During rainy season no irrigation is required, whereas during summer season irrigations at 5 – 7 days interval is must. Irrigation must be given only in furrows only.
Intercultural operations	Remove weeds by hands and if necessary use Kudali for tilling the soil for better aeration and crop growth. Provide bamboo or thread support to pole type for better growth and pod yield.
Manuring	10 – 15 tones FYM/ha should be applied 3 weeks before sowing.
Fertiliser	40-50 kg N,50 - 60 kg P_2O_5 and 40 - 50 kg K_2O/ha is recommended. Full dose of P and K and half of dose of N should be re applied as a basal dose and rest of N applied 30 days after sowing as top dressing.
Disease and its control	Powdery mildew, phytophthora rust, cowpea mosaic virus, septoria leaf spot and anthracnose are common diseases of cowpea. The fungal diseases can be controlled by spray of fungicides like Dithane M-45 (2g/lit), Wettable sulphur (3g/lit) or Dinacab (1ml/lit) at 7 days intervals. Pod borer, aphid, hopper and agromyzid fly attack cowpea. Their control is suggested with phosphomidon (0.5ml/lit) for aphids and Carbaryl (2g/lit) for pod borer.
Harvesting	Harvesting should be done at 3 – 4 days interval for getting good quality tender green pods. Bushy cultivars gives 4 – 5 pickings while from the climbing type cultivars 8 – 9 pickings can be harvested.
Yield	**Bush type** - 50 – 60 q/ha; **Pole type - 80 - 100 q**/ha

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Dolichos bean

(Dolichos lablab)

Season	Suitable for round the year cultivation Main crop Season: December – April (dry season crop)
Variety	Arka Jay, Arka Vijay, Pusa Early Prolific
Soil	Light sandy loam to clay soils
Sowing time	Rainy season- July – September Dry season – December - January
Seed rate	Bush type 50-60 kg /ha Pole type- 20-25 kg/ha
Soil preparation	The soil is prepared by ploughing 2 to 3 times and then levelling by planking. Raised beds and double row system should be practiced for higher yield and less labour requirement.
Spacing	**Bush type** - 15-20 cm distance on the ridges at 50 – 60 cm apart. **Pole type** 1 –1.5 meter apart rows and plant to plant distance around 50-75 cm.
Irrigation	During rainy season no irrigation is required, whereas during summer season irrigations at 5 – 7 days interval is must. Irrigation must be given only in furrows only.
Intercultural operations	Remove weeds by hands and if necessary use *Kudali* for tilling the soil for better aeration and crop growth. Provide bamboo or thread support to pole type dolishos bean for better growth and high yield of good quality green pods.
Manuring	10 – 15 tones FYM/ha should be applied 3 weeks before sowing.
Fertiliser	20 kg N, 60 kg P_2O_5 and 60 kg K_2O/ha is recommended. Full dose of Phosphorus and potassium and half nitrogen are applied as a basal dose and the rest N is applied top dressed at 30 days after sowing
Disease and its control	Powdery mildew, phytophthora and rust are common diseases of dolichos bean. The fungal diseases can be controlled by spray of fungicides like Ditahne M-45 (2g/lt), Wettable sulphur (3g/lt) or Dinacab (1ml/lt) at 7 days intervals. Pod borer, aphid, hopper and agromyzid fly attack cowpea. Their control is suggested with phosphomidon (0.5ml/lt) for aphids and Carbaryl (2g/lt) for pod borer.
Harvesting	Crop is ready after 75 days of sowing in bush type and 3 months in pole type. Harvesting should be done at 3 – 4 days interval for getting good quality tender fully grown green pods. Bushy cultivars give 4 – 5 pickings while pole type cultivars give 8 – 10 pickings.
Yield	**Bush type** - 50 – 60 q/ha **Pole type** - 70 – 90 q/ha

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French bean

(Phaselous vulgaris)

Season	Suitable for round the year cultivation Main crop Season: December – April (dry season crop)
Variety	Arka Komal, Arka Suvidha, Arka Anoop, Kentucky wonder, Contender, and Ooty 1
Soil	Light sandy loam to clay soils, and pH ranges between 5.3 to 6.0
Sowing time	Rainy season- July – September Dry season – December - January
Seed rate	Bush Varieties- 65 Kg/ha Pole varieties- 25-30 Kg/ha
Soil preparation	The soil is prepared by ploughing 2 to 3 times and then levelling by planking. Raised beds and double row system should be practiced for higher yield and less labour requirement.
Spacing	Bush Varieties- rows 45-60 cm apart and 10-15 cm away from seed to seed. Pole varieties- they are often sown in hills about 90x 30 m apart.
Irrigation	In dry season, frequent irrigation at 3-4 days interval is required particularly during fruiting stage. Avoid excess moisture during seed germination other-wise germination will seriously hamper.
Intercultural operations	Remove weeds by hands and if necessary use Kudali for tilling the soil for better aeration and crop growth. Remove weeds by hands or mechanically.
Manuring	10-15 t/ha
Fertiliser	Application of 120 kg N, 50 kg P_2O_5 and 50 kg K_2O/ha is recommended. Half dose of Nitrogen along with entire dose of P and K, remaining half of N should be applied at the time of earthing up after 30 days of sowing.
Disease and its control	Yellow mosaic, ashy stem blight, angular leaf spot and rhizoctonia root rot, they can be controlled by spraying Blitox or Difoliton @ 2g/litre. Root rot can be controlled by drenching Captan @ 2g/litre and for Yellow mosaic, vector white fly can be controlled by spraying Monocrotophos 1.25ml/litre. Rust can be controlled by spraying Sulfex 2g/litre.
Harvesting	First harvest will be obtained after 45 -50 days in bushy cultivars and 60 days in pole type. Three pickings in bush type and five pickings in pole type. Right time harvesting is crucial in frenchbean harvesting.
Yield	Bush Varieties- 50-60q /ha Pole varieties-80-100q /ha

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Palak *(Beta vulgaris)*

Season	Main crop: Dry season (December – April) Protected cultivation: Rainy season (May-December)
Variety	All green, Pusa Jyoti, Pusa Bharti, Pusa Harit and Jobner Green
Soil	Though it can be grown on any kind of soil that is free from bad drainage yet sandy loam and alluvial soil are best suited for them. Acidic soil are not good for growth and yield. The pH should be in between 6.0 to 7.0. It is extremely susceptible to water logging and bad drainage.
Sowing time	Dry season: January to March any time Rainy season: Round the year
Seed rate	30 -40 kg seed per hectare Overnight soaking of seeds in water improve germination.
Soil preparation	The soil is prepared by ploughing 2 to 3 times and then levelling by planking. The beds and furrow are made before sowing in the field.
Spacing	Prepare beds of 30 cm wide in furrow irrigated areas or 50-80 cm wide in drip irrigated plots. Sowing should be done in lines at 20 cm apart and 5 cm distance can be maintained in multi-harvesting plots. Line sowing is more appropriate while broadcasting is most practiced in islands.
Transplanting	Sowing of seeds should be done in 1-2 cm deep lines and cover the lines with fine soil or well powdered cow dung or FYM. Maintain proper moisture for better germination.
Irrigation	Dry season crop needs frequent irrigation at 2 -3 days interval or sometimes light irrigations on alternate day for better and early harvest. Avoid water content with leaves otherwise quality will affect and disease may occur. Protected cultivation of palak performs well drips irrigation facility.
Intercultural operations	Remove weeds by hands and if necessary use *Kudali* for tilling the soil for better aeration and crop growth. Remove weeds by hands or mechanically.
Manuring	15-20 tones well decomposed FYM or compost. Also give 5 tones of vermicompost in polyhouse and multi-harvest crop for yield and quality.
Fertiliser	Palak is nutrient responsive crop but excess use of nitrogen may affect quality of leaves badly particularly storage life.
Disease and its control	**Damping-off,** leaf spot and anthracnose affect the yield and quality of leaves. Avoid excess moisture, nitrogen and discard affected leaves immediately. Initially Bavistin 2 g/lt can be used but avoid in latter stage for consumer health.
Harvesting	Palak becomes ready for first cutting after 35 – 40 days of sowing. Only well grown succulent and tender leaves should be harvested. Palak crop give 4 -6 cuttings. After harvesting, leaves are tied in bundles and sent for marketing. Uprooting method should be used only in contingency situation.
Yield	18-28 tonnes per ha with multi-cutting and 8- 10 tonnes per ha with single harvest.
Intercropping in coconut plantations	Technology is developed for palak cultivation in coconut and arecanut plantations during dry season. Rs. 21000 per acre in two months period to the farm income or around Rs. 1 to 1.5 lakh per ha per season

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Poi or India Spinach

(*Basella alba* or *B. Rubra*)

Season	Poi grows well in hot and humid climates. So its round the year cultivation is possible in islands.
Variety	CARI Poi Selection, CARI Poi Red, Local
Soil	Wide range of soils with sandy loam to clay soils.
Sowing time	Round the year but December-January and May-June are preferred months
Seed rate	Direct sowing in broadcasting method is 12-15 kg/ha and Line sowing the seed requirement is 8-10 kg/ha. Transplanting method: around 3-4 kg seeds for one hectare
	Fresh healthy seeds should be sown in well prepared and 15-20 cm raised beds. The pro-tray technique is found effective for raising the seedlings. For this, fill the pro-tray with cocopith + vermicompost (1:1 ratio) and place one seed per plug. Seedlings are ready for planting after 5-6 weeks of sowing.
Soil preparation	The field should be well prepared by 2-3 ploughing and mixing 10-15 tonnes of farm yard manure (FYM) 15-20 days before transplanting or sowing.
Spacing	For single harvest crop (30 x 10 cm) and for multi-harvest crop (60 x 30 cm) is suggested. The raised bed (15-20 cm) of 60 cm width and with furrow of 40 cm is prepared and two lines of poi are grown on each bed.
Transplanting	Five to six weeks old seedlings or mature vine cutting (with 2-3 internodes) should be transplanted in evening hours.
Training/ Stalking	The bamboo sticks, wire nets, or wood sticks are provided to train the plants at 1 month after sowing. This helps in production of superior quality, succulent and attractive leaves which are also free from soil particles. It is most suited method for poi cultivation in rainshelters for non-traditional consumers.
Irrigation	It should be given at regular intervals of 2-3 days. Sprinkling or furrow irrigation is common for poi cultivation in islands. Drip irrigation with bed system is also suggested for water saving and higher yield of quality leaves.
Intercultural operations	Hand weeding is a common practice. Weedingshould be done 10-15 days after sowing and remove weed plants from harvested bunch of plants.
Manuring	10-15 t/ha
Fertiliser	Application of 20 kg N, 50 kg P_2O_5 and 20 kg K_2O/ha is recommended as basal dose only. If multi-harvesting is practiced, than 15-20 kg nitrogen should be broadcasted in the plot at every time.
Disease and its control	Leaf miners, cutworms and root-knot nematode damage poi crop. The damage can be minimized by the use of nylon net (32-45 mesh), removing of infested leaves, hand-picking of cut-worms, use of neem cake, soil solarization with black plastic mulch during March-April months.
Harvesting	First harvest is done after 35-40 days of transplanting by cutting the shoots from 15-20 cm height. In double row system, the first harvesting should be done after 45-50 days of sowing by cutting shoots at 10 -15 cm above ground and leaving 2-4 leaves.
Yield	15-20 tonnes/ha for single harvest and 54-60 t/ha with multi-harvesting

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Marsha bhaji/ Amaranthus

(Amranthus spp.)

Season	**It is a warm season crop adapted to the conditions of hot, humid tropics. Amaranthus can be grown round the year in different growing conditions.**
Variety	CARI AMA-Green, CARI- AMA-Red, Arka Suguna, Pusa Kiran, Pusa Kirti, Pusa Lal Chauai, CO 1, CO 2, CO 3.
Soil	Well drained organically rich and fertile loamy soil.
Sowing time	It can be grown round the year in staggered planting. But avoid the heavy rains or excess dry days.
Seed rate	2 – 2.5 Kg/ha for direct sowing.
Soil preparation	The soil is prepared by ploughing 2 to 3 times and then levelling by planking. Raised beds are suggested for rainy season cultivation of amaranths. Line sowing is ideal for weeding and intercultural operations for multi-harvesting. While for single harvesting broadcasting is common sowing method.
Spacing	Broadcast method or by drilling in lines 20-30 cm apart and 5 cm plant to plant. Sowing should be done by mixing with sand or well decomposed FYM.
Irrigation	It should be given at regular intervals of 2-3 days. Sprinkling or furrow irrigation is common for amaranthus cultivation in islands.
Intercultural operations	Hand weeding is a common practice. Weedingshould be done 10-15 days after sowing and remove weeds from harvested bunch of plants.
Manuring	Application of 20-25 tonnes/ha of Farm yard manure.
Fertiliser	Application of 20 kg N, 50 kg P_2O_5 and 20 kg K_2O/ha is recommended as basal dose only. If multi-harvesting is practiced, than 15-20 kg nitrogen should be broadcasted in the plot at every time.
Disease and its control	Leaf spot is common disease but it is rare in single harvest crops. Similarly, leaf hopper and leaf minor also appear in old plants and single harvest and their infestation is also negligible in properly maintained amaranthus crop.
Harvesting	First cutting can be obtained in 3-4 weeks after sowing, and subsequent cuttings are made at weekly intervals.
Yield	75-100 q/ha with single harvest to 200-250 q/ha with 3-4 harvests.
Intercropping with other crops	It grows well as intercrop in any of the plantations like coconut, arecanut, fruit crops and maize, brinjal, chilli, cucurbits.

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Radish

(Raphanus sativus)

Season	It is a cool season crop and roots develop best flavour, texture and size at cooler temperature range of 10-15^{0}C.
Variety	Pusa Chetki, Japanese white, Punjab Safed, CO 1, Arka Nishant, Chinese Pink Pusa Desi, Pusa Reshmi
Soil	Light friable loam soil is found to be the best.
Sowing time	December onward to February
Seed rate	9-12 Kg/ha
Soil preparation	The soil is prepared by ploughing 2 to 3 times and then levelling by planking.
Spacing	Spacing of 30 - 45 cm from row to row and 6-8 cm between plants
Irrigation	Keep soil moist till in initial crop days for better germination and crop establishment. After that regular irrigation at 2-3 days interval during December to January grown crop and alternate day in February to March grown crop. Appropriate moisture is required during root development.
Intercultural operations	The plants should be thinned to require spacing as soon as the seedlings established. Initially weed free condition favour fast crop growth while and weeding at later stage help in better quality of leaf and root harvest.
Manuring	About 20 tonnes of well rotten FYM should be mixed with soil during field preparation at least 15 days before sowing.
Fertiliser	80-100 Kg of N, 40-60 Kg of P and 80-100 Kg of K per hectare, for better growth and yield, the fertilizers should be ploughed to a depth of 10 - 15 cm for proper nutrition of the growing roots.
Disease and its control	Damping off caused by fungus *Rhizoctonia solani* is a soil borne soil disease and use of Bavistin @ 0.2g/lt. For alternaria blight- seed treatment with hot water at 50^{0}C for 30 min and then with captan @ 2g/kg are recommended.
Harvesting	Ready for harvesting in 25-35 days depending upon the variety. Late harvesting cause pithyness and bitterness in the roots so ensure timely harvesting of the roots.
Yield	10-15 tonnes/ha
Intercropping with other crops	It grows well as intercrop in any of the plantations like coconut, arecanut, fruit crops and maize, brinjal, chilli, cucurbits.

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Carrot

(*Daucus carota*)

Season	Dry season (November- February) The optimum temperature would be 18-22^0 C for root formation while germination of seed can take place within a wide range of temperature, viz. 7-25^0 C. This is new and rarely cultivated crop in islands. Roots are small but high price make it a remunerative crop in islands.
Variety	Pusa Rudhira, Pusa Varishti, Pusa Kesar, Pusa Meghali, Zeno, Ooty 1.
Soil	Well drained loose loamy soil is found to be the best. The modified growing media of sand : vermicompost : cocopith (fully decomposed) is ideal for cultivation of carrot.
Sowing time	November - December (after rainy season)
Seed rate	5-6 Kg/ha
Soil preparation	The soil is prepared by ploughing 2 to 3 times and then levelling by planking and mix FPY and basal dose of N, P and K. Prepare 10-15 cm raised beds of 30 cm width with 30 cm furrow. Prepare the bed for sowing of the seeds in the centre of the bed. The plot should be free from pebbles or stones otherwise it will affect the root development.
Spacing	Bed to bed spacing : 30 cm; plant to plant spacing - 5 cm
Irrigation	Keep soil moist till in initial crop days for better germination and crop establishment. After that regular irrigation at 2-3 days interval during December to January grown crop and alternate day in February to March grown crop. Appropriate moisture is required during root development.
Intercultural operations	The plants should be thinned to require spacing as soon as the seedlings established. Initially weed free condition favour fast crop growth while and weeding at later stage help in better quality of leaf and root harvest.
Manuring	About 20 tonnes of well decomposed FYM or compost should be mixed with soil during field preparation at least 15 days before sowing.
Fertiliser	40-50 Kg of N, 40-50 Kg of P and 80-100 Kg of K per hectare, for better growth and yield, the fertilizers should be ploughed to a depth of 10 - 15 cm for proper nutrition of the growing roots.
Disease and its control	Damping off caused by fungus *Rhizoctonia solani* is a soil borne soil disease and use of Bavistin @ 0.2g/lt. For alternaria blight- seed treatment with hot water at 50^{0}C for 30 min and then with captan @ 2g/kg are recommended.
Harvesting	Ready for harvesting in 25-35 days depending upon the variety. Late harvesting leads to more firmness of roots as well as splitting. The roots attain marketable stage when their diameter is 2-4 cm at the upper end, so ensure timely harvesting of the roots.
Yield	60 -70 quintals/ha
Intercropping with other crops	It grows well as intercrop in the plantations like coconut, arecanut and fruit crops. It can be grown as combination crop with maize, brinjal, chilli or cucurbits.

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Coriander

(*Coriandrum sativum*)

Season	Round the year in protected structures and December to March in open
Variety	Pant Harithma, Karna, Sadhna, CO 1, CO 2, CO 3, Private sector varieties
Soil	Deep and fertile loamy soils are best suited for coriander cultivation
Sowing time	Dry season crop; November – February Rainy season crop: May – October (in rainshelters only)
Seed rate	10-15 Kg/ha; Seeds are to be treated with *Azospirillum* @ 3 packets/ha. Seed treatment with *Trichoderma viride* @ 4 g/kg of seed has to be done to control wilt disease. The seeds should be soaked in plain water overnight and spit them in two halves in morning before sowing for better germination. The seeds will germinate in about 8-15 days.
Soil preparation	The field is ploughed 2-3 times and convert to a fine tilth. Add FYM before last ploughing and form raised beds (10-15 cm height and 30 -45 cm width) and channels (30 cm wide). Show the split seeds at a spacing of 20 x 15 cm.
Spacing	The 2 cm deep lines are made at a spacing of 10 - 15 cm is made and sowing is done in these lines at thinning is done and maintain a spacing 3-5 cm between plants.
Irrigation	Apply first irrigation immediate after sowing and then every day give light irrigation till germination of seeds. After germination, irrigation field alternate day initial 15-20 days and then at 2- 3 days interval for better growth.
Intercultural operations	Care is taken to maintain the field free of weeds, hoeing is done in about 30 days of sowing and after every harvest. During first harvesting thinning is done and maintain spacing of 5 cm between plants.
Manuring	15-20 tonnes of FYM per hectare
Fertiliser	60 kg N, 60 Kg P and 30 Kg K per hectare is recommended. Nitrogen is applied in two equal splits, the first dose is given basally at the time of sowing followed by a second dose after first harvest during first hoeing.
Disease and its control	Powdery mildew can be controlled by seed treatment with *Pseudomonas fluorescens* (Pf 1) @ 10 g /kg and foliar spray of Pf1 2 g/lit or Spray Wettable sulphur 1 kg/ha or Dinocap 250 ml/ha at the time of initial appearance of the disease and 2nd spray at 10 days interval. Neem seed kernel extracts 5 % spray thrice (1st spray immediately after the appearance of disease, 2nd and 3rd spray at 10 days interval). Similarly, the Wilt can aslo be controlled by seed treatment with *Pseudomonas fluorescens* @10g /kg followed by soil application of Pf1 @ 5 kg /ha. Aphids can be controlled by spraying Methyl demeton 20 EC @ 2 ml/lit or Dimethoate 30 EC @ 2 ml/lit
Harvesting	Fresh and fully grown healthy leaves of coriander are harvested after 35-40 days of sowing. It is commonly harvested by pull out the plants but multi-harvesting is suggested for increase in yield and returns from the crop.
Yield	20 - 30 quintals/ha leaves. It is suggested to harvest the leaves for local market and make small bundles for easy transportation.
Intercropping with other crops	It grows well as intercrop in any of the plantations like coconut, arecanut, fruit crops and maize, brinjal, chilli, cucurbits.

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Package of Practices (PoP) for Vegetable cultivation in Andaman and Nicobar Islands 2014

Broad Dhaniya

(*Eryngium foetidum*)

Season	Round the year cultivation but common in rainy season
Variety	CARI Broad Dhaniya, Local materials
Soil	Deep and fertile loamy soils are best suited
Sowing time	Sown during June onwards till November
Seed rate	200-300 g/ha (seedling method)
Soil preparation	The field is ploughed 2-3 times and convert to a fine tilth. Add FYM before last ploughing and form raised beds (10-15 cm height and 45-60 cm width) and channels (30 cm wide).
Spacing	Spacing of 20-25 cm between rows and 10-15 cm between plants.
Nursery production	The seeds are sown in pots or nursery beds having very fine and organically rich soils. Sowing should be done in 1 cm deep lines which are covered with fine FYM. Proper moisture and partial shade are always required for proper germination of the seeds. The germination takes 20-30 days and plants become ready for transplanting at 3- 4 leaf stage.
Transplanting	The seedlings of 3- 4 leaves or 40-45 days old should be transplanted in evening hours in well prepared field at prescribed spacing level. Immediate irrigation is required for proper establishment of crop.
Irrigation	First irrigation immediately after transplanting and one light irrigation at every day in initial years and then at every third day, there after irrigations are given at 2-3 days interval.
Intercultural operations	Care is taken to maintain the field free of weeds and hoeing is done in about 30 days of transplanting. The gaps should be filled immediately for maintaining desired plant population.
Manuring Fertiliser	20-25 tonnes of FYM per hectare This is a multi-harvest crop and can be harvested round the year. Therefore, the yearly recommendation of nutrients is 125-150 kg N, 75kg P and 50-75kg K per hectare. Nitrogen is applied in splits at sowing (25 kg/ha), 30 days (25 kg/ha) and after each of the harvesting (i.e 25 kg/ha/application).
Disease and its control	Tip burn, crown rot and 'white leaves' are observed in broad dhaniya. Crown rot appears during rainy season in densely planted crop while 'white leaves' appears during dry months. The crown rot can be prevented by proper spacing and use of copper oxichloride 2g/lt. The 'white leaves' is a powdery coating of leaves during dry months which can be avoided by regular sprinkling of water on leaves. Root knot nematode is observed in broad dhaniya which can be controlled by practicing single harvest crop or use of neem or karanja cake. Bolting is major problem during December onwards which needs to be removed for extending the harvesting season.
Harvesting	First harvesting can be obtained after80-90 days of transplanting and subsequent harvesting is possible at every 30-40 days interval.
Yield	60-80 quintal/ha
Intercropping in coconut plantations	It shade loving plant and grows well as intercrop in any of the plantations like coconut, arecanut and fruit crops.

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