



*ICAR-Central Island Agricultural Research Institute,
Port Blair, Andaman and Nicobar Islands, India*



Immunity Boosting Plants for Urban Households of Andaman Islands




Prepared by:

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Supported by:


National Bank for Agriculture and Rural Development




*ICAR-Central Island Agricultural Research Institute
Port Blair, Andaman and Nicobar Islands, India*

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1) *Spices*



Bush Pepper

- **Scientific name:** *Piper nigrum*
- **Growth habit:** Bushy plant suitable for partially shaded as well as open conditions.
- **Uses:** A method of round the year production of black pepper in the home gardens.
- **Planting material:** Rooted cuttings from fruiting branches.
- **Planting and aftercare:** Plastic pots of about 22 L size should be filled with soil and well decomposed farmyard manure (3:1, v/v). Application of vermicompost (about 1 kg) in two splits.
- **Harvesting:** Spikes are harvested when a couple of berries start ripening. Berries are separated from spikes and dipped in hot water for 2 minutes to develop uniform coloured product. Berries are then dried. A berry could be crushed between teeth and the cracking sound could be used as drying indicator.





Rooted cutting of bush pepper



Bush pepper plant in fruiting



Mature pepper berries



Blanched pepper



Dried pepper

Cinnamon

- **Scientific name:** *Cinnamomum verum*
- **Growth habit:** Medium tree (pruned to bush) suitable for partial shades as well as open conditions.
- **Uses:** For preparation of decoctions and flavouring.
- **Planting material:** Air layers of improved varieties.
- **Planting and aftercare:** Could be grown in large grow bags or pots filled with soil and well decomposed farmyard manure (3:1, v/v). Plant responds well to pruning. No major pests or diseases are noticed. Split application of vermicompost is desirable.
- **Harvesting:** Stems of cricket stump size thickness are cut 10 cm above ground level, outer layer is scrapped and inner bark is peeled out before drying in shade (about 4-5 days) followed by short drying in sun (few minutes).





Mother plant with dark red young flush



Air layering in cinnamon



Ready to plant layer



Scraping of outer bark



Peeling of bark



Shade drying



Dried bark

Culantro

- **Scientific name:** *Eryngium foetidum*
- **Growth habit:** Herb suitable for partial shades.
- **Uses:** As a flavouring agent and for garnishing.
- **Planting material:** Naturally germinated seedlings could be used for planting as seeds show low germination percentage.
- **Planting and aftercare:** Seedlings could be planted in small pots, growing bags filled with soil: well decomposed farmyard manure (1:1, v/v). A few plants could be allowed to flower to facilitate seed set for regeneration of the plants.
- **Harvesting:** Fresh mature leaves could be plucked as and when required or plants could be uprooted after about 2-3 months of planting. The herb has better shelf life and stronger aroma than green coriander/ cilantro.





Culantro plants in old water tank



Profuse flowering



Seeds of culantro



Naturally regenerated seedlings



Luxuriant growth in Dweep HanGreens



Raised bed cultivation in the backyards



Ginger

- **Scientific name:** *Zingiber officinale*
- **Growth habit:** Rhizome bearing plant suitable for partial shades as well as open conditions
- **Uses:** For flavouring, preparation of decoctions and other Ayurvedic preparations
- **Planting material:** Rhizome bits with sprouts are used.
- **Planting and aftercare:** Propagules are planted during April in grow bags filled with well drained soil and organic manures such as farmyard manure or vermicompost. Covering the underground rhizomes (earthing up) which get exposed and provision of drainage are required.
- **Harvesting:** Rhizomes could be harvested by carefully uprooting from the substrates after the leaves dry up (about 7 months from planting).





Rhizomes with sprouted buds



Ginger in grow bag



Ginger cultivation in grow bed



Mango Ginger

- **Scientific name:** *Curcuma amada*
- **Growth habit:** Rhizome bearing plant suitable for partial shades as well as open conditions.
- **Uses:** For flavouring of dishes and in herbal medicines.
- **Planting material:** Rhizomes bits with a few sprouts.
- **Planting and aftercare:** Propagules are planted before onset of monsoon in April in grow bags filled with well drained soil and organic manures such as farmyard manure or vermicompost. Covering the rhizomes (earthing up) as and when they get exposed.
- **Harvesting:** Rhizomes could be harvested by carefully uprooting after 6 to 7 months when the leaves dry up.





Mango ginger in grow bed



Mango ginger cultivation in raised bed system



Mango Ginger

- **Scientific name:** *Curcuma mangga*
- **Growth habit:** Rhizome yielding plant suitable for partial shades and open conditions.
- **Uses:** To impart raw mango like aroma to dishes.
- **Planting material:** Rhizomes bits with a few sprouts.
- **Planting and aftercare:** Grow bags filled with well drained soil and organic manures are used for planting of propagules before onset of monsoon in April. Covering the rhizomes (earthing up) as and when they get exposed.
- **Harvesting:** During Dec- Jan, rhizomes could be harvested by uprooting when the leaves dry up.





Rhizome piece with sprouted bud



Luxuriant growth of Mango ginger in grow bed

Tejpat

- **Scientific name:** *Cinnamomum tamala*
- **Growth habit:** Medium tree (pruned to bush) suitable for both partial shades and open conditions.
- **Uses:** Leaves are used for flavouring of various cuisines.
- **Planting material:** Air layers are used for planting as seed set is generally not noticed in the islands.
- **Planting and aftercare:** Could be grown in growbags or pots of larger size filled with soil and well decomposed farmyard manure (3:1, v/v). Plant responds well to pruning. Split application of vermicompost. No major pests or diseases are noticed.
- **Harvesting:** Leaves could be plucked and air dried before using in the cooking. Small branches could also be harvested and hung upside down on ropes in a room provided with fans. Dried leaves could then be separated.





Air layer ready for planting



Tejpat plant growing in pot



Healthy leaves being shade dried

Turmeric

- **Scientific name:** *Curcuma longa*
- **Growth habit:** Rhizome bearing plant suitable for partial shades as well as open conditions.
- **Uses:** For Ayurvedic preparations, decoctions and flavoring.
- **Planting material:** Pieces of rhizomes with 1 or 2 sprouts are used.
- **Planting and aftercare:** Rhizomes are planted before onset of monsoon in grow bags filled with well drained soil and organic manures viz. farmyard manure or vermicompost. Putting soil above the rhizomes 2-3 times during growth to avoid exposure to sunlight.
- **Harvesting:** Rhizomes could be harvested by carefully uprooting from the substrates after the leaves dry up.





Turmeric in grow bags



Turmeric in grow beds



Freshly harvested turmeric rhizomes

Woody Pepper

- **Scientific name:** *Piper pendulispicum*
- **Growth habit:** Vines suitable for partial shady locations.
- **Uses:** Stem pieces are used as spice in vegetarian and non vegetarian preparations.
- **Planting material:** Rooted cuttings prepared using serpentine layering could be used for planting.
- **Planting and aftercare:** Pots of about 22 L size filled with well drained soil and farmyard manure (3:1, v:v). Provision of drainage is must as vines are sensitive to water logging.
- **Harvesting:** Branches are harvested once they become sufficiently thick (more than an inch) and outer layer is scrapped off before making pieces.





Serpentine layering for multiplication



Woody pepper vine in a pot



Thickening of vine



Harvested stem

2 *Fruit Bearing Plants*





Guava

- **Scientific name:** *Psidium guajava*
- **Growth habit:** Medium tree, maintained by pruning in pots.
- **Uses:** Fruits rich in vitamin C and fibre are suitable for fresh consumption as well as juice.
- **Planting material:** Air layering.
- **Planting and aftercare:** Layers are planted in large pots, tanks or growbags. Pruning and bending of branches is known to promote flowering.
- **Harvesting:** Fresh fruits could be harvested and consumed at all the stages.





Ready to plant air layer



Guava in grow bag



Pruning for inducing new branches



Flowering

Lime

- **Scientific name:** *Citrus aurantifolia*
- **Growth habit:** Bushy plant maintained by pruning
- **Uses:** Fresh fruits are used for preparation of drinks and for flavouring.
- **Planting material:** Air layers or seedlings could be used for planting.
- **Planting and aftercare:** Propagules are planted in large pots. Seasonal incidence of leaf miner and mealy bugs are noticed. Spraying neem oil and manual plucking of infested branches reduce the incidence.
- **Harvesting:** Fruiting is noticed in three seasons in well maintained plants. Mature fruits, when turn their colour to light yellow, are harvested.





Lime in potted condition



Harvested produce



Passion Fruit

- **Scientific name:** *Passiflora edulis*
- **Growth habit:** Vines are suitable for growing on fence, arches, nets etc.
- **Uses:** Fruits are used for fresh consumption as well as juice making.
- **Planting material:** Seedlings raised from fresh seeds are vigorous in growth than vegetative propagules.
- **Planting and aftercare:** Seedlings could be planted in 22 L pots. Split application of manures is desirable. Purple type is more sensitive to water stress than yellow, hence judicious watering is needed.
- **Harvesting:** Vines come to fruiting after 8 to 12 months of planting. Three fruiting seasons are noticed in a year.





Fruits laden on vine



Flowering



Fully ripe fruits



Watery Rose Apple

- **Scientific name:** *Syzygium aqueum*
- **Growth habit:** Pruned to bush form. Suitable for sunny locations as well as partial shades.
- **Uses:** Fruits are consumed in fresh form.
- **Planting material:** Air layers are used for planting.
- **Planting and aftercare:** Layers are planted in large pots or grow bags filled with nutrient rich substrate such as soil + farmyard manure. Formative pruning is required to train the plant in pot. It also promotes fruiting.
- **Harvesting:** About 3 years are required for first fruiting, while 2-3 fruiting seasons are noticed in a year. Fruits are harvested when they turn pale/ creamish green.





Air layer ready for planting



Pot Cultivation



Developing fruits in potted plant



Harvested produce



West Indian Cherry

- **Scientific name:** *Malpighia puniceifolia*
- **Growth habit:** Bush to small tree suitable for sunny locations.
- **Uses:** Fresh fruits are among the richest sources of vitamin C. Fruits could be consumed raw or processed.
- **Planting material:** Rooted stem cuttings are used for planting.
- **Planting and aftercare:** Cuttings are planted in 22 L pots. Application of organic manures (about 1 kg) in 2-3 splits is beneficial. Pruning of branches is desirable for giving shape as well as crop regulation.
- **Harvesting:** Fruiting commences after about 12-15 months of planting. Flowering occurs throughout the year with about 3 major pickings.





Rooted cutting ready for planting



Potted cultivation of West Indian Cherry



Flowering



Fruiting in well trained bush



Ripe fruits

3 *Aromatic & Medicinal Plants*



Aloe

- **Scientific name:** *Aloe vera*
- **Growth habit:** Herb suitable for sunny locations.
- **Uses:** Pulp useful for skin diseases, burns etc.
- **Planting material:** Offshoots emerging near the base of mature plants.
- **Planting and aftercare:** Small sized pots filled with well drained soil and offshoots are planted. Place the pot in sunny location. Avoid over watering as it may result in rotting.
- **Harvesting:** As per requirement, leaves could be cut using a blade carefully without damaging the the plant. The outer layer should be removed and pulp could be collected using a spoon.





Aloe vera plant in potted condition



Offshoot emerging from the mother plant – suitable for planting



Brahmi

- **Scientific name:** *Bacopa monnieri*
- **Growth habit:** Herbal plant suitable for growing in shades as well as open condition.
- **Uses:** Leaves are known to improve memory. Used in preparation of herbal formulations.
- **Planting material:** Stem cuttings are easy to root and hence used for planting.
- **Planting and aftercare:** Considering the shallow roots, it could be grown in small pots filled with soil rich in organic matter. Plant requires good moisture in substrate for proper growth .
- **Harvesting:** Herb could be harvested by cutting the mature branches and could be used in fresh or dehydrated forms.





Brahmi grown in Dweep HanGreens



Brahmi grown in beds in backyard



Gaja Pipali

- **Scientific name:** *Piper chaba*
- **Growth habit:** Vine that can grow over a live or dead support.
- **Uses:** Fruits are useful in preparation of herbal medicines and for flavouring.
- **Planting material:** Rooted stem cuttings.
- **Planting and aftercare:** Medium sized pots filled with well drained soil and farmyard manure (3:1, v:v) are suitable for planting. Application of vermicompost (500 g) promotes good growth of vines. Watering should be done judiciously to avoid root rot.
- **Harvesting:** Fruits are picked when ripe i.e. when they turn orange. Fruits are then sun dried before storage in cool and dry place.





Developing fruits



Plants with ripe fruits

Tulsi

- **Scientific name:** *Ocimum tenuiflorum*
- **Growth habit:** Herbal plant suitable for both partial shades and open sun.
- **Uses:** Leaves are used in preparation of decoctions and Ayurvedic formulations.
- **Planting material:** Seedlings could be raised from mature seeds. Naturally regenerated seedlings near old plants could also be uprooted carefully and used for planting.
- **Planting and aftercare:** Small pots filled with well drained soil and farmyard manure could be used. Time to time removal of dead branches and inflorescence improves the plant growth .
- **Harvesting:** Leaves are plucked as and when required and used in fresh or dried forms.





Potted cultivation



Removal of flowering tops to promote healthy growth



Mature inflorescence and harvested seeds

Kalmegh

- **Scientific name:** *Andrographis paniculata*
- **Growth habit:** Herb suitable for open conditions and partial shade.
- **Uses:** Leaves are used in the preparation of decoctions and medicinal formulations.
- **Planting material:** Plant produces profuse fruits which could be harvested when fully ripe and seeds could be used for raising seedlings.
- **Planting and aftercare:** Small pots are filled with soil: farmyard manure (3:1, v:v). Plant grows well without any major maintenance.
- **Harvesting:** Leaves could be plucked and used in fresh form for preparing decoctions.





Potted plant



Flowering

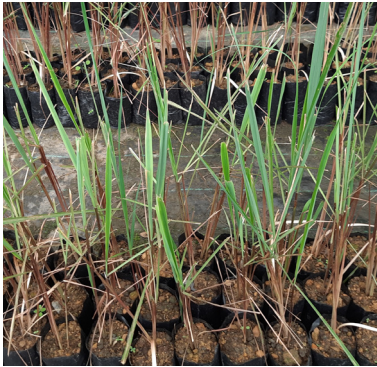


Fruits and seeds

Lemon Grass

- **Scientific name:** *Cymbopogon flexuosus*
- **Growth habit:** Grass suitable for cultivation in sunny locations.
- **Uses:** Herbage is useful for preparing herbal teas and for flavouring of foods.
- **Planting material:** Seeds and slips i.e. individual plant tillers could be used for planting .
- **Planting and aftercare:** Could be grown on boundaries in home gardens or in medium sized pots filled with well drained substrate. Provision of drainage is required for healthy growth of the plants.
- **Harvesting:** For marketing, leaves could be harvested leaving about 10-15 cm from ground after 4 months of planting and thereafter at 4 months interval for 4-5 years. For household purpose, leaves could be plucked as and when required.





Rooted slips ready for planting



Lemon grass on boundary



Harvested produce

Long pepper

- **Scientific name:** *Piper longum*
- **Growth habit:** A small herb suitable for planting in shade as well as open conditions.
- **Uses:** Fruits are used in Ayurvedic preparations and decoctions, while roots as pipalmool.
- **Planting material:** Rooted cuttings from two to three node stems are ideal.
- **Planting and aftercare:** Could be planted in small pots with well drained soil. Application of organic manure improves growth and fruiting.
- **Harvesting:** Fruiting starts within 2-3 months of planting and fruits are harvested once they attain maximum size. Fruiting occurs recurrently. Fruits are dried in sun, while roots are uprooted after about 2 -3 years .





Potted cultivation



Profuse fruiting

Mandukparni

- **Scientific name:** *Centella asiatica*
- **Growth habit:** Herb suitable for growing in both shaded and open conditions.
- **Uses:** Herb is known to improve memory and is used in the preparation of herbal formulations.
- **Planting material:** Plants could be multiplied by runners .
- **Planting and aftercare:** Plant has shallow roots and could be grown in small pots filled with soil rich in organic matter. Grows luxuriantly in moist places.
- **Harvesting:** Herb could be harvested by cutting the mature branches and could be used in fresh or dehydrated forms.





Cultivation in grow bed



Hanging pot



Harvested produce

Mint

- **Scientific name:** *Mentha spp.*
- **Growth habit:** Small herb suitable for growing under open conditions.
- **Uses:** Whole herb is used for imparting flavour to food and beverages apart from use in herbal formulations.
- **Planting material:** Stem cuttings are easy to root and could be used for planting.
- **Planting and aftercare:** Cuttings are plated in pots or long grow bags as the plant spreads covering the area. Provision of drainage, protective irrigation and application of organic manure is desirable.
- **Harvesting:** Herb could be harvested by cutting the plants above 8-10 cm above the base and used in fresh or dehydrated forms.

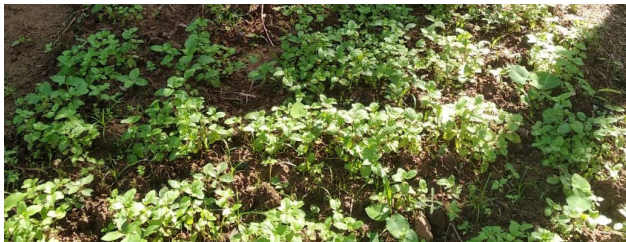




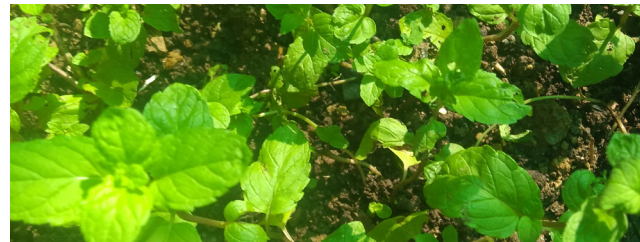
Planting in grow beds



Luxuriant growth in grow beds



Planting in raised beds



Growth in raised beds

Pipali Bhaji

- **Scientific name:** *Piper sarmentosum*
- **Growth habit:** Bushy plant suitable for sunny and shady locations.
- **Uses:** Leaves are consumed as vegetable while fruits have medicinal value.
- **Planting material:** Plants could be multiplied using two node stem cuttings.
- **Planting and aftercare:** Plants grow luxuriantly without much care, however it responds well to organic nutrients.
- **Harvesting:** Branches could be harvested when still tender for use as vegetable. Fruits are harvested at mature stage and dried in sun before storage.

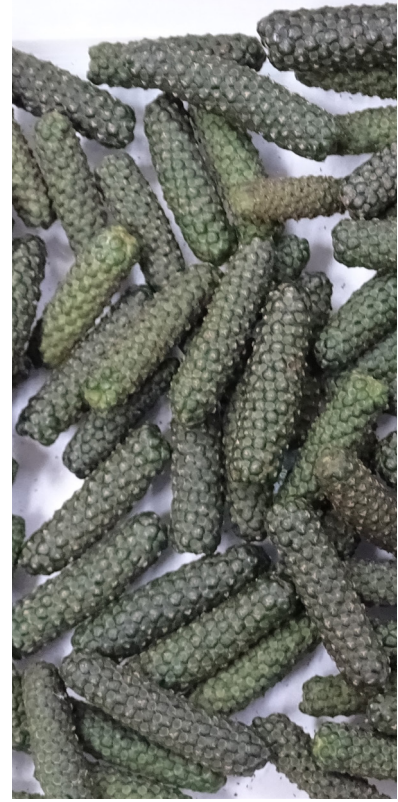




Potted cultivation



Induction of flowering



Harvested fruits

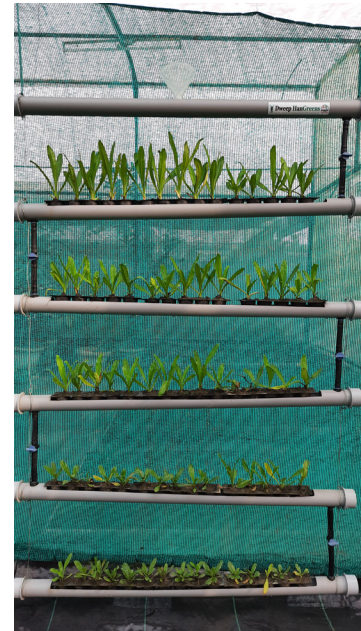
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Novel Systems of Cultivation

Dweep HanGreens

- **Application:** A hanging model for cultivation of small herbs in balconies and shaded terraces in urban areas. It provides produce for daily consumption apart from giving aesthetic appeal to the area.
- **Details:** Based on space available and family requirement, structure size could be customized and hence, it is user-friendly. It could also be used as green curtains for beautification of areas including government and private establishments, tourist spots, hotels etc. With limited investment, user can accommodate more number of plants than the conventional pots and hence, get manifold produce.
- **Suitable species:** Various plants such as culantro, brahmi, mandukparni, mint and ornamental plant such as office time could be grown in it.





Mandukparni



Culantro



Brahmi

Dweep ProDhaniya

- **Application:** A novel technology of cultivating culantro/broad coriander in pro-trays for promoting its cultivation in urban and periurban areas.
- **Details:** The developed technology involves use of pro-trays with 50 cavities and of about 5 cm depth with soil and vermicompost (1:1, v:v) as substrate. Seedlings of 2-3 leaf size are planted in each hole, thereby accommodating 50 seedlings in each tray.
- **Harvesting:** Depending on growing conditions and management practices followed, each protray could produce 300-600 g of fresh produce.





Culantro in Dweep ProDhaniya system



Luxuriant growth



Dweep ProDhaniya Multi

- **Application:** A multi-tier system suitable for cultivation of broad coriander in urban areas. Appropriate for hoteliers and urban growers for producing the herb on small scale.
- **Details:** The technology involves growing the herb in pro-trays filled with soil and vermicompost (1:1, v/v). Pro-trays are arranged in vertical racks to accommodate multiple trays in each rack. Using this compact model of variable rack size, desired amount of herb could be produced in urban areas such as terraces, balconies etc.
- **Harvesting:** Depending upon the growing conditions and management practices followed, each rack could produce 2-5 kg of fresh produce in each harvest cycle.

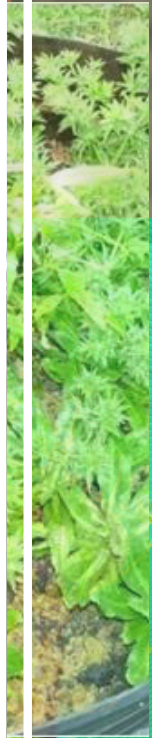
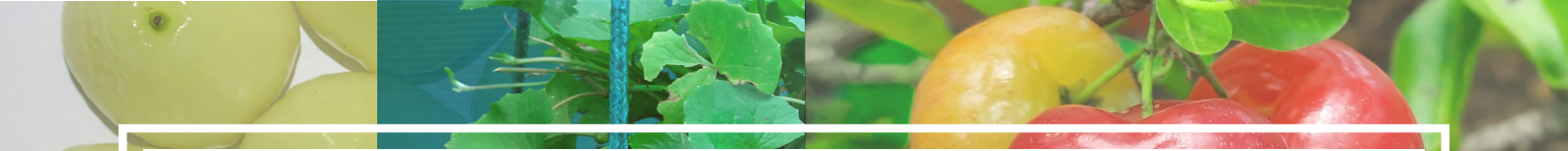




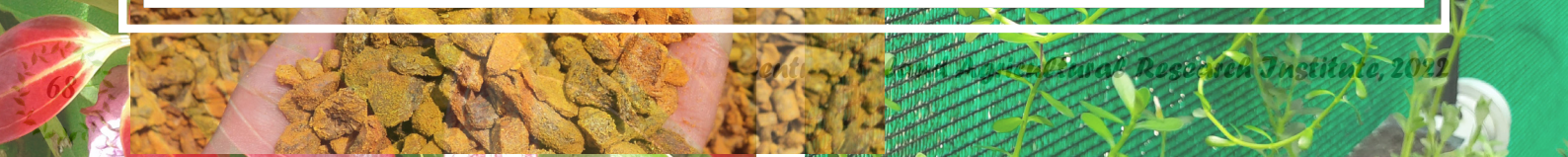
Culantro in Dweep ProDhaniya Multi system



Harvested produce



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