

# Organic Package of Practices for Cocoa Pod

	<p><b>Disease mgmt.</b></p> <p><b>Black pod rot</b></p> <p><b>Charcoal pod rot</b></p>	<ul style="list-style-type: none"> <li>The pods are susceptible to the attack at all the stages of development. Pods enlarges concentrically and evenly to involve the whole pod surface. The affected area quickly darkens and the whole pod turns dark brown to black.</li> <li>Spray 1 % Bordeaux mixture immediately after the onset of the south-west monsoon and there after at least twice during the monsoon season at an interval of 45 days, removal of infected pods, over- crowding of trees and thick shade should be avoided.</li> <li>The symptoms initially appear as pale yellow spots whereby the ' spots enlarge into larger lesions having a chocolate brown colour. Young pods when infected are mummified and shriveled. The internal tissues are rotten and the affected beans turn black.</li> <li>Remove all affected pods, spray Bordeaux mixture (1%) or measures to control insects and rodent pests will also help in reducing the incidence.</li> </ul>
11	<b>Harvesting</b>	<p>It takes about 170 days for a cocoa pod to develop from formation to maturity. Ripening takes about 25 days, during which, the pods change colours, green pods becoming orange, yellow and red pods turning orange. Pods remain suitable for harvesting for fairly long time after they have ripened. Harvesting should be done at regular intervals rather than daily, once in 7-10 days. Harvesting involves removing the ripe pods from the trees and opening them to extract the wet beans. Pods are removed by cutting with a sickle-sharp knife, without damaging the cushion from which it is developed. Only ripe pods have to be harvested without damaging the flower cushions by cutting the stalk with the help of knife. The harvesting is to be done at regular intervals of 10-15 days.</p>
12	<b>Drying and Storage</b>	<p>The cocoa beans can be dried either in the sun or by artificial means. Sun drying can be done in thin layers of 2 - 3 cm. depth and stirring from time to time. When the beans are dried properly, they produce a characteristic cracking sound on compressing a fistful of beans in the palm. The more scientific method is to use moisture meter.</p> <p>The fruit broken, shrivelled and other extraneous materials (flat, broken and other defective beans) are removed. The cleared bags are kept on a raised platform of wooden planks. The dried beans with moisture content of 6-8% may be packed in polythene bags (if only small quantities are involved) or polythene lined gunny bags (in the case of larger stocks). The store should be sufficiently ventilated and the bags should be kept on a wooden platform with air space of about 15-20 cm below the wooden planks set over the floor. The humidity should not exceed 80% so as to prevent mould development and pest incidence in the beans. To avoid drop in viability during long periods of storage. The extracted seeds may be stored in moist charcoal and then packed in polythene bags.</p>
13	<b>Yield</b>	<p>The rough average is about 500 kg per hectare per year, 70-100 fruits per plant where 25 fruits give one kilo of dried product and an optimum of 800 trees per hectare.</p>



## Common Insect & Disease Symptoms of Cocoa Crop



Red borer



Mealy bug



Charcoal pod rot



Colletotrichum pod rot



Black pod rot

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## Organic Cocoa Pop Cultivation

<b>1</b>	<b>Selection and preparation of land</b>	<p>Clay or sandy loam soils with a pH range of 6-7.5 and more than 3.5% of organic carbon are well suited for cocoa cultivation. It is required to test the soil once a year to check the levels of pH, organic carbon, macronutrients (NPK), micronutrients and microbial load in the field.</p> <p>If the organic carbon content is less than 2%, apply 25-30 tons/ha of FYM and plough the field 2-3 times to mix the manure thoroughly.</p> <p>Adequate buffer zone must be provided between certified organic fields and nonorganic fields at a distance of about 7 meters from non-organic fields to prevent drift of prohibited materials on to certified organic fields.</p>
<b>2</b>	<b>Sowing season and time</b>	Though cocoa seeds germinate at any time of the year, the best period of sowing the seeds in nursery is December-January so that 4-6 months old seedlings will become available for field planting by the onset of the monsoon i.e. May-June in the traditional areas.
<b>3</b>	<b>Variety selection</b>	Seed selection is an important step in organic tomato production. Seeds should be carefully selected from certified organic farms or from farmers' own field which is raised organically. The seeds (which are not treated with chemicals) from local high yielding varieties can also be used in the absence of organically produced seeds. Select disease resistant and locally demand varieties. There are three major varietal groups -Criollo, Forastero and Trinitario. Forastero are best suited for Indian conditions. Kerala agricultural university has released seven improved clones of Forastero & they are CCRP 1, CCRP 2, CCRP 3, CCRP 4, CCRP 5, CCRP 6 and CCRP7. These are suitable for warm tropical areas under the shade of coconut.
<b>4</b>	<b>Seed rate and spacing</b>	The seedlings are planted with a spacing of 2.7-3 m and require 1000 to1600 seedlings per hectare.
<b>5</b>	<b>Seedling raising</b>	<p>Cocoa can be propagated through seeds or by vegetative means. For raising seedlings, seeds of mature pods are taken from high yielding mother plants. The mother plants selected should yield more than 100 pods per year and should have medium or large green pods with an average dry bean weight of not less than one gram. A more suitable procedure for planting good quality seedling will be to collect hybrid seeds from bi clonal or polyclonal seed gardens involving superior self-incompatible parents.</p> <p>The normal potting mixture with farm yard manure, sand and soil in equal proportions is good for raising cocoa seedlings.</p>
<b>6</b>	<b>Soil fertility management</b>	<ul style="list-style-type: none"> <li>Application of organic manures will be useful in the early establishment period. It may not be necessary after about three to five years as cocoa litter will be the rich in abounded source of organic matter. The creation of organic material through mulching and pruning activities is sufficient for an economically viable production – provided a stratified (multi-phase), diverse and densely planted system is in place.</li> <li>Dolomite @ 100 g / plant / year may be applied to plants from the third year onwards. Under irrigated conditions, the yearly dose may be split into four and applied during April-May, September-October, December and February-March. Apply 1/3 of adult dose during the first year of planting, 2/3 during second year and full dose from the third year onwards.</li> <li>Apply Farmyard Manure @ 40kg/plant or fresh vermicompost @ 20 kg/plant in four equal split doses in May, September, December and February under irrigated conditions or in two equal splits in April-May and September-Oct under rainfed conditions.</li> <li>Apply wood ash @ 1kg/plant.</li> <li>Apply biofertilizer, PGPR mix I as enriched organic manure.</li> </ul>

		<ul style="list-style-type: none"> <li>Inoculate with AMF in the nursery and field at the time of planting.</li> </ul>
<b>7</b>	<b>Transplanting and Spacing (main field)</b>	Four to six months old seedlings are generally used for field planting. Since seedling vigour and final yield are closely related, the seedlings for field planting should be selected based on seedling vigour. Seedling vigour can be estimated based on height of seedlings and stem girth.
<b>8</b>	<b>Irrigation and water requirement</b>	Regular watering is essential to keep the soil moist. Over watering should be avoided in order to check the outbreaks of diseases. Cocoa grows well as a rain-fed crop under conditions of well-distributed rainfall and irrigation is not necessary. If sufficient moisture is not present in the soil due to prolonged drought or failure of rains, irrigation is to be given once in five days. Irrigation, however, helps in better growth of plants and precocity in bearing. Providing adequate irrigation helps in increasing the yield by about 30 % both in mono as well as in mixed crop.
<b>9</b>	<b>Cultural practices and weed management</b>	<p>During the first three or four years after planting, it is essential to keep the field free from weeds. Maintenance and regulation of shade should be carried out promptly. During the establishment phase of the crop particularly in summer, provide mulching with materials like chopped banana sheath, coconut husk, cocoa husk etc. to conserve moisture in conditions of direct insolation. A mature cocoa plantation should form a proper canopy, which will be dense enough to prevent weed growth. Operations such as pruning and regulation of shade should be attended to in time.</p> <p>Cocoa is planted as a pure, mixed crop or intercrop. When planted as a pure crop, Dadap (<i>Erythrina lithosperma</i>) is planted at 3x 3m spacing to provide shade. Dadap needs pruning every year. For more permanent shade, <i>Albizia stipulate</i> can be planted adopting 9x9 or 12x12m spacings. This requires 4 to 6 years to develop proper canopy to provide sufficient shade. Cocoa can be planted as intercrop in coconut gardens provided the spacing of coconut is sufficient to provide enough shade and the soil is suited to cocoa. In arecanut gardens too, cocoa can be planted as intercrop. The spacing of arecanut should not be less than 2.7 x 2.7 m.</p>
<b>10</b>	<b>CROP PROTECTION</b>	<ul style="list-style-type: none"> <li>Crop rotation prevents build up of diseases and nematodes and suppresses weeds. It helps in breaking pest cycle.</li> </ul>
<b>(a)</b>	<b>Insect mgmt.</b>	
	<b>Red borer</b>	<p>Caterpillar bores into the stem or branches to feed on the wood. In early stages of attack, young plants or braches show wilting. Pellet-like excrement of the larva hangs out and accumulates at the base of the plant. In advanced cases, the branch dries up.</p> <ul style="list-style-type: none"> <li>Prune off and burn affected plants or twigs, field release of white muscardine fungus <i>B. bassiana</i> and braconid parasite <i>Amyosoma zeuzerae</i>, periodic release of <i>Trichogrammatoidea bactrae fumata</i> (obtained from the eggs of rice moth <i>Corcyra cephalorica</i> Staint) were used.</li> </ul>
	<b>Mealy bug</b>	<ul style="list-style-type: none"> <li>The bugs occur in cherelles, developing pods and shoots and de-sap the tissues.</li> <li>Band the trees with 20 cm wide alkalthene of polythene (400 gauge), stem with jute thread and apply a little mud of fruit tree grease on the lower edge of the band, Release of Australian ladybird beetle, <i>Cryptolaemus montrouzieri</i> @ 10/tree.</li> </ul>
	<b>Bihar hairy caterpilla</b>	<ul style="list-style-type: none"> <li>Caterpillars feed gregariously by scrapping the chlorophyll of leaves, Later caterpillars disperse and feed voraciously.</li> <li>Collect and destroy egg masses and caterpillars, use burning torch to kill the congregating larvae, use light trap to attract and kill the adults.</li> </ul>