

Oil Palm

Elaeis guineensis

Directorate of Horticulture, Odisha, Bhubaneswar

OIL PALM CULTIVATION

- Oil Palm (Elaeis guineensis Jacq.) is a native of Guinea Coast of West Africa.
- It belongs to family Palmae and tribe cocoineae.



Why we should go for Oil Palm?

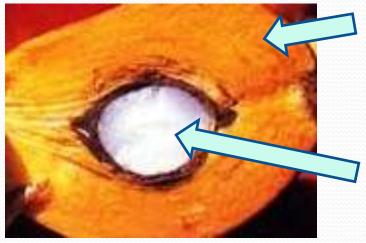
 Per capita Vegetable Oil consumption in India is 14.60 kg (2010-11)

All Oilseed crops like Mustard, Sesamum,
 Groundnut, Sunflower, Soyabean and Coconut grown
 over 26.11 million ha., producing 6.30 million MT
 vegetable oils but to meet the domestic demand
 India has to import 8.63 million MT Palm oil from
 Malaysia and Indonesia (2009-10)

Why we should go for Oil Palm? Contd...

- Oil palm can provide 18.00 MT Palm oil/ha/year
- Oil Palm is the highest oil producer among the perennial oil yielding crops and produces two distinct oils i.e. Crude Palm Oil (CPO), extracted from mesocarp and Palm Kernel Oil (PKO), from kernel





Crude Palm Oil

Palm Kernel Oil

Why we should grow Oil Palm?

 Provides highest edible oil (Min 4 – 6 MT to Max 18-20 MT/ha/year) compared to other oil yielding crops

Gives assured income (monthly twice)
 throughout the year from 4th year to 30th year

 No risk of theft of Oil Palm bunches like coconut and other fruits

Harvest per Palm per Year

Age	No of	Average	Harvest	Return	Gross
	Bunches	weight (kg)	in Kg/	@	Return in
		of Bunch	palm	Rs.7/kg	Rs./ha
3	4	3	12	84	12,012
4	9	5	45	315	45,045
5	9	7	63	441	63,063
6	9	9	81	567	81,081
7	9	12	108	756	1,08,108
8	9	14	126	882	1,26,126
9	7	17	119	833	1,19,119
10	7	18	126	882	1,26,126
11	7	19	133	931	1,33,133

Harvest per Palm per Year

Age	No of Bunches	Average weight (kg) of Bunch	Harvest in Kg	Return @ Rs.7/kg	Gross Return in Rs./ha
12	6	2	12	84	1,20,120
13	6	21	126	882	1,26,126
14	6	22	132	924	1,32,132
15	6	22	132	924	1,32,132
16	6	23	138	966	1,38,138
17	5	23	115	805	1,15,115
18	5	23	115	805	1,15,115
19	5	24	120	840	1,20,120

GOVERNMENT INTERVENTION

- ➤ Oil Palm cultivation was initiated under Integrated Scheme for Oilseeds, Pulses, Oil Palm & Maize (ISOPOM) during 1992-93 & is known as Oil Palm Development Programme (OPDP)
- Area covered (from 1993-94 to 1997-98) : 1971 ha
- > Super Cyclone during 1999, damaged entire plantation leaving a remnant of 88.00 ha.
- Subsequent coverage during 2003-04 to 2004-05 is only: 43 ha
- > Total: 131 ha Old plantation
- From 2006-07 new plantations made with joint effort of MoU signed Companies

Area Expansion Programme for Odisha

Year	Area in Ha
Up to 2011-12	9967
2012-13	4000
2013-14	4000
2014-15	4000
2015-16	4000
2016-17	5000

Year	Area in Ha
2017-18	5000
2018-19	5000
2019-20	5000
2020-21	6000
2021-22	6000
Total:	57969

Success through Joint Effort

Govt.

MoU Company



Farmer

Govt. Officers' Job:

- Director of Horticulture will fix Target for the District
 & provide Allotment to DDH/ADH
- DDH/ADH of the District has to consult with the ADH, AHO & Officers of the MoU signed Company and finalise in which Block how much area to be covered
- After finalisation of programme for each component, DDH/ADH has to fix the target for AHOs at Block level
- AHO has to communicate the target to concerned HEWs

Govt. Officers' Job:

Contd...

- DDH/ADH & AHO has to inspect the Oil palm Nursery and ensure availability of Seedlings as per target
- HEW & Company staffs have to select Beneficiaries and submit list to concerned AHO of the Block
- AHO has to finalise the list of Beneficiaries for different components considering suitability of land, cluster area and possibility of Irrigation/ Drip installation
- DDH/ADH has to carryout all the steps through AAE & Drip Companies for Installation of Drip/Micro sprinkler system

Govt. Officers' Job:

Contd...

- DDH/ADH & AHO have to prepare their own Work Plan as a check list to perform execution of work in stipulated period of the month
- DDH/ADH has to release subsidy on each component immediately after execution
- DDH/ADH & AHO have to popularise the scheme through adequate Publicity in keeping Flex Boards at Sub-Division & Block level/ Exhibition/ distribution of leaflets
- DDH/ADH has to ensure execution of Tripartite Bond

Company Officers' Job:

- Assist HEWs in Selection of Beneficiaries
- Coordinate with DDH/ ADH/ AHO and Farmer in executing each component of the scheme
- Assist Beneficiaries in layout of Plantation and timely technical guidance/ training
- Ensure application of Nutrition/ Fertigation,
 Irrigation and Plant Protection measures
- Collect FFBs from the Beneficiaries' field immediately after harvest and timely payment

Farmers' Job:

- Cooperate Govt and Company Officials in executing their works
- Ensure proper and management of the crop to get optimum yield
- Consult with Govt and Company Officials for any difficulties faced in rearing the palm seedlings

Climatic Requirements

Oil Palm is a humid tropical crop.

- Rain fall: Requires evenly distributed rainfall of 150 mm/month or 2500-4000 mm/annum.
- Rainfall distribution in Odisha is not even, hence grow the crop only with assured irrigation source.
- Temperature: Crop comes up well between 29-33°C max. and 22-24°C min. temperatures.
- Sunlight: Bright sunlight for at least 5 hrs. per day.
- Humidity: High humidity of more than 80%.

Soils:

- Grows well on all types of soils.
- ➤ Best suited soils are moist, well drained, deep, loamy alluvial soils, rich in organic matter with good water permeability.
- >At least one meter depth of soil is required.
- **Don't:** Avoid highly alkaline, highly saline, waterlogged and coastal sandy soils.

Cultivated variety





- Tenera is the ruling hybrid grown all over the world
- It is a cross between thick shelled dura and shell less pisifera
- Tenera has a thin shell, medium to high mesocarp content and high oil content.

Planting season

- Planting can be done in any season
- Best period is June December
- In case of planting during summer season adequate irrigation, mulching and growing cover crops like sunhemp in the basin will help to overcome the summer













A VIEW OF NURSERY



Age of seedlings for planting:

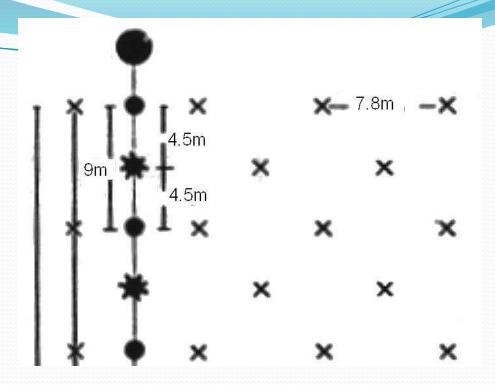


- 10-14 months old healthy seedlings with 1-1.3 m height from base and 13 functional leaves with good girth at collar are used for planting.
- Seedlings up to 24 months age can also be used.

Plant population: 143
 plants per hectare or
 57 plants per acre

 Spacing: 9mx9mx9m (triangular planting)





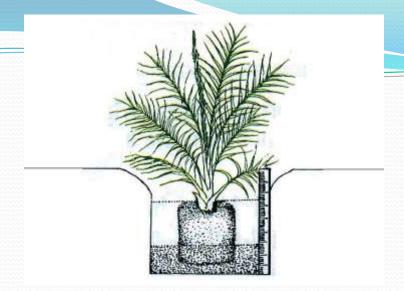
Planting pit size:
 60cm x 60cm x 60cm



Planting method:

- Take the pits prior to planting and allow to season.
- Transport quality seedlings to the planting site only at the time of planting.
- Apply 250 g DAP or 250 g rock phosphate and 50 g phorate and mix with the soil at the base of the pit.
- Remove the bag by making a longitudinal cut and put the seedling in the pit along with the soil.





- Fill the gap in the pit with soil and press firmly leaving the top portion so that the seedling bowl will be 25 cm below the ground level.
- Immediately after planting form basin and give copious irrigation.
- Provide a wooden support if wind is more.

 Take care to see that the soil does not get accumulated at the crown region, which may lead to rotting of crown.

 In case of low lying wet land soils planting should be done in raised mounds to avoid water logging and poor aeration.

 Don't: Do not store the seedlings for days together in open place after lifting and transporting to the farm.

Distribution of Planting Material:

 Assistance enhanced for planting material from 75% of the cost limited to Rs.7,500/ha (under ISOPOM) to 85% of the cost limited to Rs.10000/ha for entire land holding of the farmer

Year	ISOPOM	RKVY
Planting Year	75% of cost per ha limited to Rs. 7,500/-	85% of cost per ha limited to Rs. 10,000/-

Irrigation:

- Oil Palm requires sufficient irrigation as it is a fast growing crop with high productivity and bio-mass production.
- Don't: Do not grow Oil Palm if assured and adequate irrigation facility is not available.
- Insufficient irrigation will lead to reduce the rate of leaf production, affects the sex ratio, and results in inflorescence abortion and yield reduction.

• Quantity of Water:

For grown up yielding palms of 3 years age and above a minimum of 150 liters of water per day is a must. However, in older plantations during hot summer this amount may be increased up to 200 lit.

• Frequency of irrigation:

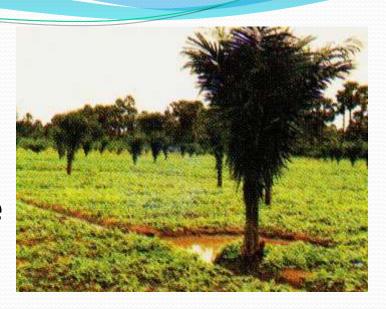
For light soils frequent irrigation with less water to be given. If more water is given at a time leaching loss of nutrients will be more. In heavy soils irrigation interval can be longer.

Method of Irrigation:

(i) Basin:

When irrigation water is not constraint, basin irrigation can be taken up. Required quantity of water can be given at weekly intervals.

- Prepare irrigation channels in such a way that the individual palms are connected separately by sub-channels.
- Don't: Do not form channel along palm rows.





(ii) Drip or Micro sprinklers:

If irrigation water is limited and land is of undulated terrain drip or micro sprinkler irrigation can be advantageous.



- If drip irrigation is installed four drippers have to be placed for each palm. If each dripper discharges 8 liters of water per hour,
 5 hr of irrigation per day is sufficient to discharge 160 liters/day.
- Drip or micro sprinklers ensure adequate moisture supply every day.
- Drippers should be periodically checked for proper discharge.
- Basins should be adequately mulched and covered with soil which will help to conserve moisture.
- Don't: Do not run the irrigation channels along the palm rows.

Creation of Water Source:

 Subsidy for bore wells at oil palm farm (50% of the cost limited to Rs.50,000/bore well or water harvesting structure)

ISOPOM	RKVY	
Rs. Nil per unit	Rs. 50,000/- per unit	



Pump set:

- Supply of Pump set for drip system
- Pump set (diesel/electric) of capacity up to 10 HP
 @ 50% of the cost limited to Rs10,000/pump set)

ISOPOM	RKVY
Rs. 50,000/- per unit	Rs. 50,000/- per unit

8. Supply of Drip irrigation systems:

- 50% of the cost of drip irrigation system for spacing of oil palm plantation at 9X9M.
- The assistance will be provided as per the subsidy admissible under National Mission on Micro-Irrigation (NMMI) up to 5 ha per farmer



ISOPOM	RKVY	Size of holding
Rs. 9300/-	Rs. 10,450/-	1 ha

Subsidy under Drip/Micro Sprinkler

Area	Indicative cost	Subsidy limit (70%) for Big farmer	Subsidy limit (80%) for Small/Marginal farmer
0.2 ha	Rs.9588	Rs.6712	Rs. 7,670.40
0.40 ha	Rs.16604	Rs.11623	Rs. 19,186.40
1.00 ha	Rs.23983	Rs.16788	Rs. 19,186.40
2.00 ha	Rs.39371	Rs.27560	Rs. 31,496.80
3.00 ha	Rs.60780	Rs.42546	-
4.00 ha	Rs.76644	Rs.53651	_
5.00 ha	Rs.97314	Rs.68120	-



Fertilizer application:

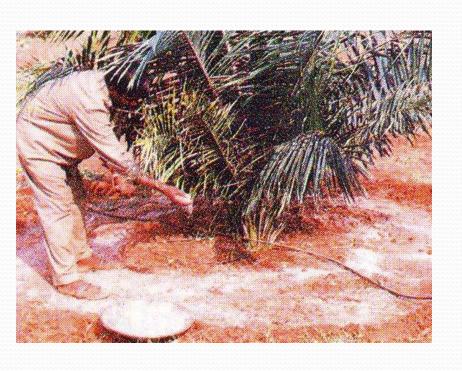
- Oil Palm is a gross feeder and demands a balanced and adequate supply of macro, secondary and micro nutrients for growth and yield.
- The following fertilizer schedule is considered satisfactory for Oil Palm under rain fed conditions.

Age of the	Nutrients (gm/palm/year)			
palm	N	Р	К	Mg ₂ SO ₄
1 st Year	400	200	400	125
2 nd Year	800	400	800	250
3 rd Year onwards	1200	600	1200	500

Time of application:

- Two equal split doses during July-August and December-January.
- For the newly planted crop the first dose of fertilizer application may be given three months after planting.
- Add 50-100kg FYM or 100 kg green manure per palm along with the second dose of fertilizer application.
 Five kilograms neem cake/palm can also be applied.

Method of application:



- Broadcast the fertilizers around the clean weeded basin, about 50 cm away from the palm base and incorporate into the soil by forking.
- Irrigate the palms immediately after fertilizer application.

Input support for Plant Nutrition & Plant Protection under RKVY:

- Support for
 - Nutrients (Fertilisers) & Micronutrients,
 - Insecticides/ Pesticides,
 - Tree guards etc.
- Rs. 35/- per plant

Year	ISOPOM	RKVY 50% of total cost
Planting Year	Rs. Nil per ha	Rs. 5000/- per ha

5. Construction of Vermi-compost Units at Oil Palm field:

- To promote use of organic manure and vermicompost in oil palm
- 50% of the cost limited to Rs.15000 per unit
- Unit size: 15 Meter length,
 - 0.9 Meter width and
 - 0.24 Meter height

ISOPOM	RKVY	
Rs. Nil per unit	Rs. 15,000/- per unit	

Basin management:



- During first year basins of 1 metre radius to be taken around the palm removing the soil from inside so that the soil will not accumulate at the collar region.
- Basins must be widened to 2 m radius during second year and 3 m radius from third year onwards.
 Basin area of Oil Palm almost represents its active root zone.
- Hence it must be kept clean and weed free to avoid competition for nutrients and water.

Weeding:

- Take up regular weeding manually or with the use of only recommended herbicides.
- Use preferably contact herbicides.
- Herbicide mixtures of Paraquat with Atrazine, Monuron and Diuron sprayed on ground, twice a year can control the weeds effectively.
- Mulching, growing cover crops and inter-crops minimizes weed growth.
- Don't: Do not use 2, 4-D, 2, 4, 5-T halogenated aliphatic acids,
 Dalapon and TCA. These compounds produce abnormalities in
 Oil Palm.
- See that the spray fluid does as not spill on the Oil Palm plants.

Pruning:



- Maximum number of green leaves should be retained on the palm.
- Only the lower dried and diseased leaves must be pruned.
- While pruning give a clean cut to the petiole as close to the stem as possible with a sharp chisel.
- Any damage to petiole or stem will attract disease organisms.
- Don't: Severe pruning will adversely affect both growth and yield of the palm.







Maintenance of Plantation:

 Assistance for cost of cultivation during gestation period (50% of the cost of cultivation) to the farmers.

Year	ISOPOM	RKVY
Planting Year	Rs. 4600/- per ha	Rs. 6000/- per ha
2 nd Year	Rs. 3300/- per ha	Rs. 3500/- per ha
3 rd Year	Rs. 3500/- per ha	Rs. 4500/- per ha
4 th Year	Rs. 4100/- per ha	Rs. 6000/- per ha

Inter-cropping:

- Oil Palm is a wide spaced perennial crop with a long juvenile period of 3 years. Hence lot of horizontal and vertical space both above and below ground is available.
- This space can be used to generate income during the juvenile phase of the crop.
- Crop selected for intercropping should be compatible with the main crop and should not compete with Oil Palm for light, water and nutrients.

- Any crop can be grown, but the most suitable crops Vegetables, Banana, Flowers, Tobacco, Chillies, Ginger, Pineapple etc.
- Don't: While raising inter-crops avoid tying of Oil Palm fronds which will reduce photosynthetic activity and ploughing close to the palm base which will cut the absorbing roots and thereby reduce intake of water and nutrients. Allow Oil Palm to grow freely.



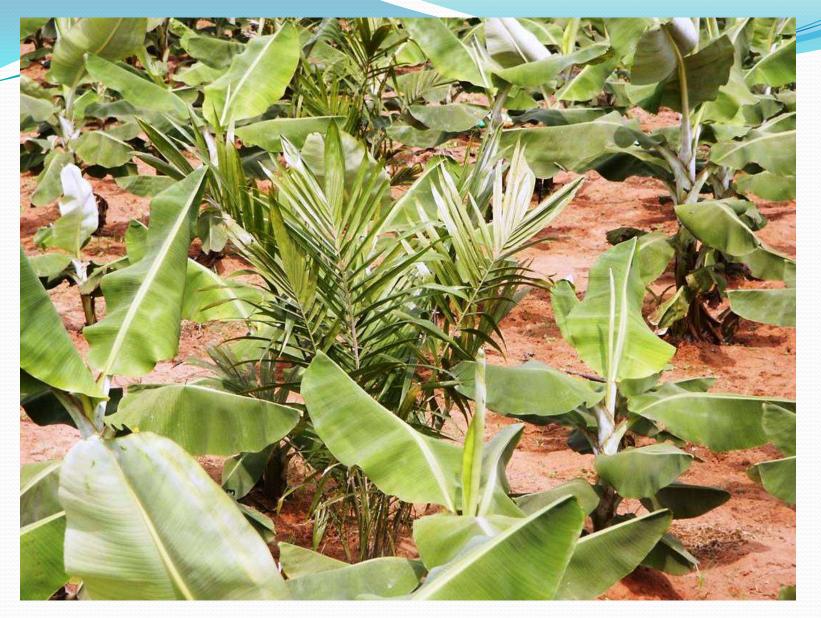




Inputs to inter-cropping in Oil Palm fields:

- 50% of the cost limited to @ Rs.10000/-ha for purchase of planting material of horticultural inter-crops/ seed material of fields crops.
- 75% funds for procurement of planting material/ seeds and
 25% for production/ protection inputs for inter-crop fields
- 50% area of main plantation shall be taken up for intercropping.

Year	ISOPOM	RKVY
Planting Year	Rs. Nil per ha	Rs. 10,000/- per ha



Oil palm with Banana



Oil palm with Chillies



Oil palm with Lemon grass



Oil palm with Turmeric



Oil palm with Black pepper



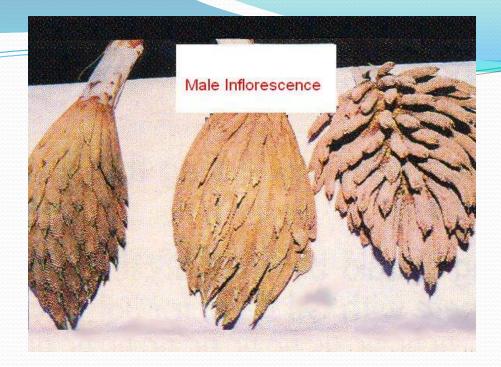
Oil palm with Groundnut

Flowering:

- Oil Palm comes to flowering 14 -18 months after planting.
- It produces both male and female flowers separately on the same palm (monoecious).
- Male and female phases do occur naturally in consequent cycles in a palm.
- Some individual trees may exhibit a phenomenon of producing more male inflorescences and less number of female inflorescences.
- No need to worry about this phenomenon as long as the average annual production is satisfactory. Overall there should be an average of 10-12 bunches per tree per year.

- Large number of male flowers occur due to the following reasons resulting in low yield.
- Insufficient irrigation and irrigation at longer intervals.



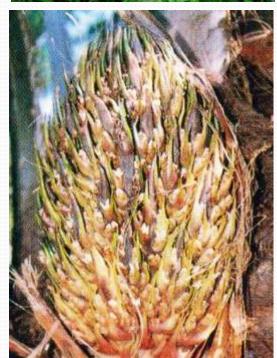


- Non-application of recommended doses of fertilizers and other manures in appropriate quantities and time.
- Excessive pruning of fronds.
- Ploughing deeply and close to the palms damaging the active feeding roots.

Ablation:

- Ablation is the removal of male and female flowers produced in the early stages of plantation.
- This enables the plant to gain adequate stem girth, vigour and develop adequate root system.





- Flowering starts from 14th to 18th month after planting. Start ablations immediately after the appearance of inflorescences on the palms. They can be removed easily by hand pulling.
- Ablation can be extended up to 2-1/2 to 3 years depending upon the plant growth and vigour.

Pollination:

- Oil Palm is a highly cross pollinated crop. Pollination is assisted by wind and insects, but wind pollination is not adequate.
- Effective pollinating insects like Elaeidobius kamerunicus helps in good pollination and fruit set.
- Release of this weevil after 2-1/2 years of planting is advisable.
- If the plants are not having good girth and vigour release the weevils after 3 years.

Mulching:



- Mulching of Oil Palm basins is essential to conserve moisture as well as to control weeds.
- Mulching can be done with dried leaves, male flowers, coconut husk, empty bunches brought from factory, etc.



- In adult plantations all the cut leaves can be heaped in between two rows of Oil Palm which can act as mulch.
- These mulching materials in addition to conserving moisture, maintain soil temperature, add organic matter and nutrients mainly potassium, improve physical and biological properties of soil.

Cover cropping:

- The most common cover crops that can establish well in Oil Palm plantations are Pueraria phaseoloides, Calapagonium mucunoides, Centrosema pubescens, Mimosa invisa, Mucuna sp. etc.
- These cover crops can be sown after taking intercrops for first 2-1/2 years.



- Cover crops are sown in the entire field leaving the basin.
- In pure plantations these cover crops can be sown at the time of planting of Oil Palm seedlings.
- These cover crops can be ploughed in after they are overgrown.
- Cover crops help in soil and water conservation and check weed growth. When incorporated they also improve the organic matter content of soil and plant nutrient status.

PLANT PROTECTION

- Insect, avian and mammalian pests of Oil Palm and their management:
- Most of the pests of Coconut are found to attack Oil Palm. Control measures for all the pests are available and are given below.

Pests of nursery:

a) Spindle bug:

Symptom:

- Necrotic lesions and dry brown patches on leaves.
- Spindle fails to open.

Control:

- Keep Phorate (2g) filled perforated poly sachets in the leaf axil.
 - b) Tussock caterpillar:

Symptom:

Defoliation of leaves.

Control:

- Hand picking of caterpillars.
- Cut and burn the damaged leaves.
- Spray Monocrotophos (0.036%) or Carbaryl (0.1%) if infestation is severe.

c) Root grubs/Cockchafer beetles:

Symptom:

Sudden death of young plants.

Control:

- Fill the seedling bags with the soil free from root grub infestation.
- Apply 50g Phorate per seedling while planting the sprouts.
- Don't:
- Do not collect the soil from root grub endemic areas for filling the seedling bags.

d) Termites:

Symptom:

Stunted growth of the plant.

Control:

- Give copious irrigation.
- Apply quinalphos (0.06%) or chlorpyriphos (0.05%)
 - e) Wild boar:

Symptom:

Destruction of the boll region.

Control:

Wild boar scaring device may be kept.

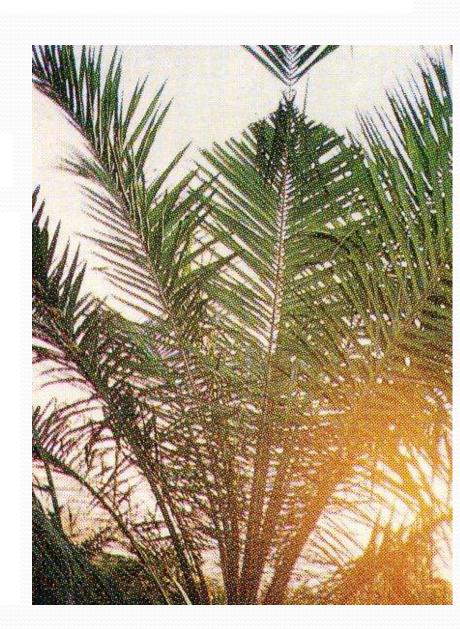
Pests of adult palms:

i) Major pests:

a) Rhinoceros beetle:

Symptom:

- "V" shaped gaps in the leaf silhouette.
- Hole at the leaf base and chewed up fibre is seen at that place.



Control:

- Destruction of breeding sites.
- Maintain sanitation in the orchard.
- Extraction and killing of insect from spindle portion with metallic hook.
- Trap the adults with fermented castor cake or pheromone bait.

For preparation of fermented castor cake, take fresh castor seeds and roast them. Grind them and mix with 'rice water' or 'thadi/Torani' or 'yeast' for fermentation.

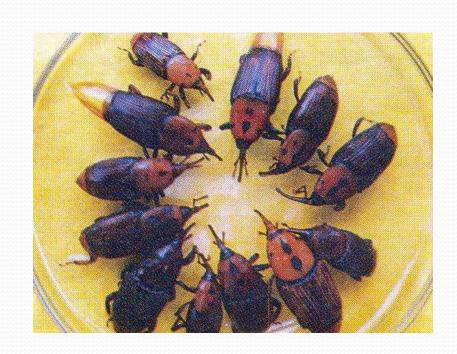
After 12th day keep sufficient quantity into individual wide mouthed earthen pots and place them near Oil Palm plant to attract the adult beetles.

- Use bio-agents like virus (Baculovirus oryctes) and fungi (Metarrihizium anisopliae).
- Use completely rotten farm yard manure or compost.
- Treat the compost pits with insecticides like carbaryl or quinalphos (0.025%) regularly to kill the young stages of the pest.
- Don't: Do not apply partially rotten Farm Yard Manure or Compost to the palms as they may contain grub stages of the pest.

b) Red Palm Weevil:

Symptoms:

- Palms show gradual wilting and drying.
- Presence of few holes and oozing of borwn viscous liquid from these holes at the base of the palm.
- Grubs feeding inside the trunk make characteristic sound.



- Removal of damaged and dead palms, rotten bunches from the orchard.
- Apply 'tar' to the wounds and cuts on stem portion to avoid the egg laying.
- Trap the adult beetles using log or pheromone baits.
- Maintain good sanitation in the orchard.
- Root feeding of monocrotophos (mix 10 ml of insecticide in 10 ml of water) may be followed.
- Don't: Do not make wounds on the stem portion of the palm.

c) Case worm:

Symptoms:

- Holes on the leaves.
- Occasional defoliation.
- Cone shape bags on the under surface of the leaves.

- Cut and burn badly infested leaves.
- Spray carbaryl (0.1%) on infested leaves.
- Root feeding of monocrotophos (mix 10 ml of insecticide in 10 ml of water) may be practised if infestation is severe.

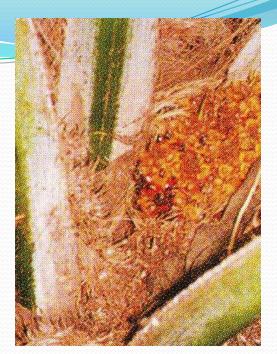


d) Birds:

Symptoms:

 Bird feeding symptoms on mesocarp of fruits resulting in fruit and oil loss.

- Cover the fruit bunches with wire net or Coconut or Oil Palm leaves after 150 days of fruit set.
- Use bird scare devices.





e) Rats:

Symptoms:

- Damage symptoms on young fruits.
- Gnawing symptoms on exposed pericarp of the fruit.
- Damage to the boll region and killing the young palms.

- Follow Integrated management practices using all the possible measures of control.
- Baiting with Zinc Phosphate, use of iron live trap, snap trap, death fall trap or bow trap etc.
- Keep Aluminium phosphide tablets in the rat holes.
- Cover the base portion of the plant with wire mesh while planting.
- Keep anticoagulants like 'ratabar' in the crown region on the bunches.









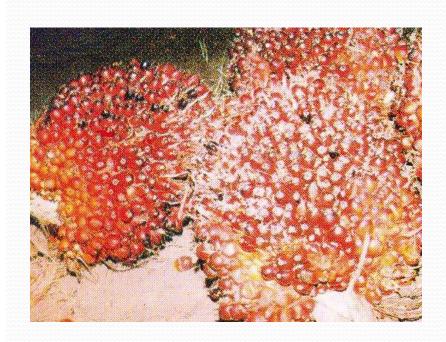
ii) Minor Pests:

a) Scales and Mealybugs:

Symptoms:

- Yellowing of unfolding leaves.
- Stunted growth, Infests on fruit bunches.

- Naturally suppressed by bioagents.
- If need be spray any systemic insecticide like phosphamidon or dimethoate (0.03%).



b) Termites:

Symptoms:

 Feeding symptoms on the spear leaves, male inflorescence and fruit bunches.

- Give copious irrigation.
- Apply quinalphos (0.06%) or chlorpyriphos (0.05%) in the basins if infestation is severe.
- Find the termite nests/mound and destroy.

Diseases of Oil Palm and their Management

So far it is observe that only a few diseases are prevalent on Oil Palm in India. Among which, the important ones are mentioned below

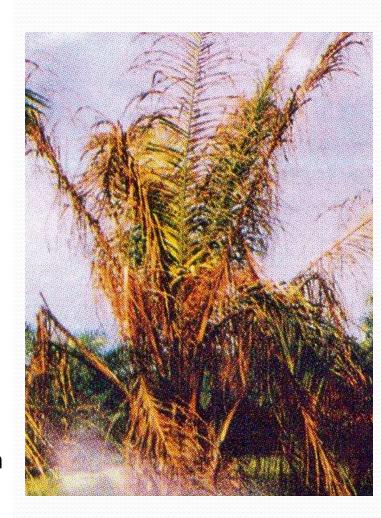
a) Stem Wet Rot:

Symptoms:

- Sudden death of spear leaves including the young expanded fronds surrounding the spear.
- Remaining fronds show yellowish discolouration and then rapidly wither and die.
- Some times, the older leaves die first and the symptoms progress to the younger fronds.

Effect:

- The affected palm usually will have a cavity of variable size filled with rotten fibrous mass at the centre of the stem.
- Rotting mass will be generally bright yellowish in colour.
- At the base of the stem it is fibrous usually black in colour and sightly wet.



Management:

- Improvement in agronomic practices, providing drainage, avoid flooding of the field etc.
- Early detection of the disease and trunk surgery can save the palm.

Early detection of diseased palms:

- In case of suspected palms for confirmation of the disease, a sharp iron rod may be pierced into the stem base, which gives out some liquid.
- If the liquid gives putrified smell, the palm should be subjected to trunk surgery immediately.

Trunk Surgery:

- Trunk surgery is done to excise all affected firbous tissues from inside the trunk.
- First the outer stem tissues and frond butts should be chiseled.
- The inner most disease tissues including yellowish lesions which are generally seen along with the border of healthy and diseased tissues also should be removed.
- When the surgery is completed a potective covering with carbendazim (1%) + monocrotophos (1ml) paste followed by hot coal tar should be given to prevent the wound invading micro-organisms and insects.



Don'ts:

- ➤ Do not allow water to stagnate in the fields, avoid flooding of the field.
- ➤ Do not leave the tissues exposed after trunk surgery. Give protective coat with coal tar and fungicides immediately or on the following day.
- > DON'T USE COPPER FUNGICIDES.

b. Bud rot disease:

Symptoms:

- Yellowing of the spear leaves which subsequently turns to brown.
- Affected spear bends at the base and seen hanging down in the crown.
- The basal tissues of the spear completely gets rotted, as a result it collapses and can easily pulled out.
- The rotten tissues emit offensive odour.
- Continuous and unchecked rotting leads to total destruction of meristem and ultimately death of the palm.
- Often, the disease becomes rampant during, the monsoon season when the inoculum build up reaches high.
- Palms of all ages are prone to this disease.

Disease Management:

- It is possible to cure very effectively, if the disease is detected in the early stages i.e. when the spindle starts showing symptoms of withering, yellowing and dropping down.
- The affected spear should be pulled out along with the decayed tissues.
- The affected tissues in the crown should be removed and drenched with fungicide solution, like Carbendazim or Thiram (0.1%)

- For treating advance stage disease affected palms, first of all, the leaves surrounding the spear should be cut and the affected tissues of the meristem should be removed layer by layer till fresh tissues are seen.
- Once the affected tissues are completely removed the exposed tissues of the apical bud should be cleaned and smeared with 1% carbendazim solution. The exposed portion should be covered with dried leaves or perforated polythene sheet.

Prophylactic Check:

 Where the beetle damage is predominantly high, it should be checked by keeping 10 g of phorate granules in perforated polythene sheet.

Dont's:

- Do not delay in giving treatment.
- Curative measures like removing the rotten tissues, crown surgery should be done as early as possible after the initial symptoms are seen.
- The rotten tissues and spear removed from the affected palms should not be left in the field. Those should be collected and burnt.
- While doing crown surgery to remove the rotten tissues care should be taken not to split or damage the apical bud.
 Always use a sharp knife.

c) Basal Stem Rot (ganoderma):

Generally the disease incidence can be expected in the coastal estates where the old coconut plantations are already affected by the disease and soils are infected with the pathogen.

Symptoms:

- Withering, yellowing and orange discolouration of the leaves followed by necrosis on one side of older fronds.
- Desiccated fronds drop or break at some point along the rachis.
- Appearance of light brown lesions / rotting of the bole at the stem base is characteristic symptom at the advanced stage of disease.
- The infected palms appear suffering with malnutrition.
- The disease produces dry rot of internal tissues at the base of trunk.
- The roots become friable and disintegrate easily. The internal tissues turn into dry and powdery mass.

Management of the disease:

- There is a little hope of saving the affected palms as by the time symptoms are visible more than 50% of the basal stem tissues get affected. However, the disease progress can be checked by-
- Field Sanitation: Removal and destruction of the dead and diseased palms in order to prevent the spread of the disease.
- Isolation of diseased Palms: The palms in the early or middle stages of the disease should be isolated from the neighbouring palms by taking trenches of 1 m deep and 30 cm wide.
- Affected palm should be given 5 kg of neem cake/year.
- The disease affected and apparently healthy palms should be treated with 10 ml. Calixin (tridemorph) or 10 g Aureofungin sol (in 100 ml of water) per palm through root feeding.
- The suspected disease palms should be uprooted and destroyed immediately as soon as they are noticed.

Dont's:

- Do not plant the Oil Palm seedlings in the area where Ganoderma disease of coconut is prevalent or the area is prone for the Ganoderma.
- Water movement, ploughing and other management practices should not be allowed to move from the disease affected palm site to the other areas of the garden.

d) Bunch Rot:

Bunch rot disease is one of the imortant diseases affecting the fresh fruit bunches thus causing direct economic loss.

Symptoms:

- During the early stages of infection, strands of mycelium can be seen spreading over the bunch surface.
- Mycelium development is profused particularly at the back of the bunch.
- In the later stage, the mycelium grows over the fruit surface and penetrates into the mesocarp.
- The infected bunch becomes completely rotten and unfit for harvest.

Cause:

 Diseased bunches left on palms itself spread the disease from one bunch to other bunch of the palm.

Control:

- Sanitation: Before on-set of monsoon, crown cleaning by means of removing the dead inflorescences, bunch stalks, aborted bunches etc. will help in reducing the inoculum buildup and harbouring of pathogen.
- Chemical Control: To check the spread of the disease and to eradicate the inoculum of the fungus, crowns of the infected palms should be thoroughly cleaned and sprayed with 0.1% Carbendazim solution.

Don'ts:

- Do not leave the rotten, aborted bunches and dried inflorescences on the crown.
- DON'T USE COPPER FUNGICIDES. OIL PALM IS SENSITIVE TO THEM.

Exposure Visit





Visit of farmers to DOPR Pedavagi for Exposure as part of ISOPOM scheme

Harvesting:

- Harvesting should be aimed at recovering the whole harvestable produce without loss of oil or loose fruit.
- Proper and timely harvesting of fruit bunches is an important operation which determines the quality and quantity of oil to a great extent.
- When the bunch is matured and ready for harvesting a) fruits in the bunch turn yellowish orange, b) 5-10 fruits from each bunch drop on their own, c) when pressed hard with the fingers orange coloured oil exudates from the fruits.
- If overripe bunches are harvested lot of loose fruits will fall on the ground and collection is difficult. FFA (Free Fatty Acid) content will also be high.

Oil Palm - Harvesting





Oil palm harvesting tools







- If under ripe bunches are harvested oil content is less and wastage is more.
- While harvesting a stalk length of 5 cm alone should be left.
- Harvesting should be done at 10-12 days interval.
 During rainy season harvesting should be done at closer interval of 6-7 days as ripening is hastened after hot summer.
- In young plantations we get more bunches with less bunch weight and in adult plantations the bunch weight is more but the bunch number is less. The following table can be used as reference to production and bunch weight and number in dry zones.









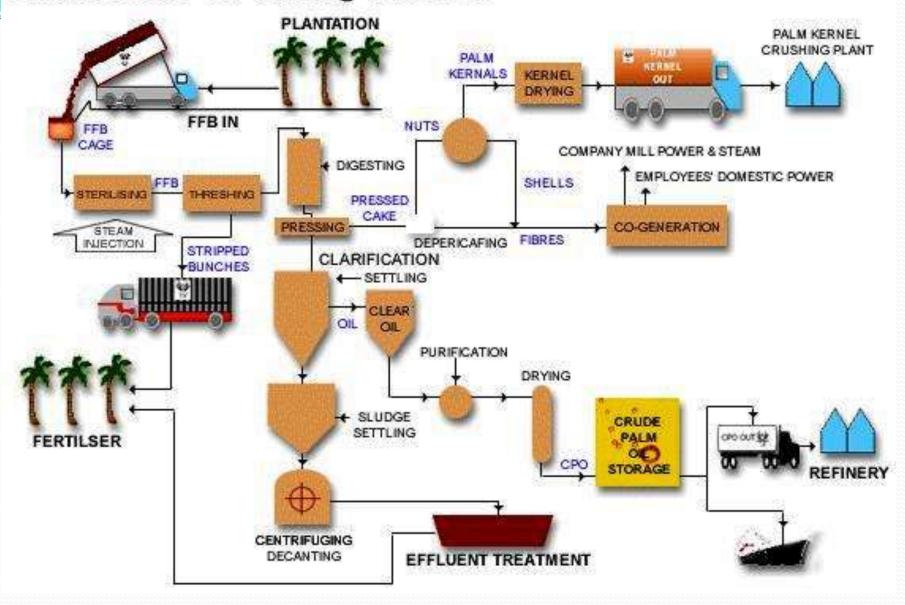
8. Setting up of Oil Palm processing units:

 50% of the cost limited to 250.00 lakh per unit for the mill of 5 MT/hr FFBs processing capacity

ISOPOM	RKVY
Rs. Nil per unit	Rs. 2.5 crore
	per unit



Crude Palm Oil Milling Process



Dont's:

- Do not harvest pre-mature bunch.
- Do not harvest over riped or under ripe bunch.
- Do not spray water on the harvested bunch.
- Do not leave more stalk length.
- Do not dirt the bunches with soil.
- Do not store the harvested bunches.
- Do not harvest empty bunch.
- Do not harvest Rotten bunch.
- Do not harvest Pest and disease affected bunch.
- Do not harvest dried bunch.

Harvest Tools:

- For young crown a sharp chisel attached to an aluminium/ iron rod is enough.
- For adults palms of 8' height and above harvesting knife fitted to a aluminium rod extendable up to 45 ft can be used.

Other uses:

- Palm Oil has excellent health attributes. Such as rich in Vitamin A and Vitamin E, cholesterol free and helps in reducing the risk of heart diseases. It also has anti-cancerous properties.
- Palm oil can be used in formulation of margarine and cooking fats such as Vanaspathi and shortening.
- It can be used in the manufacture of biscuits, ice creams, soaps, detergents, shampoos and also as a frying fat.
- Palm kernel oil has a variety of industrial uses.



















Ripened



Immature



Under-ripe



Over ripened

Thanks