

## *Presenting Code 2*

# CODE OF GOOD MANUFACTURING PRACTICES (CoP)

For Palm Oil Mills

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MPOB

Lembaga Minyak Sawit Malaysia • Malaysian Palm Oil Board





# 1. WEIGHING BRIDGE

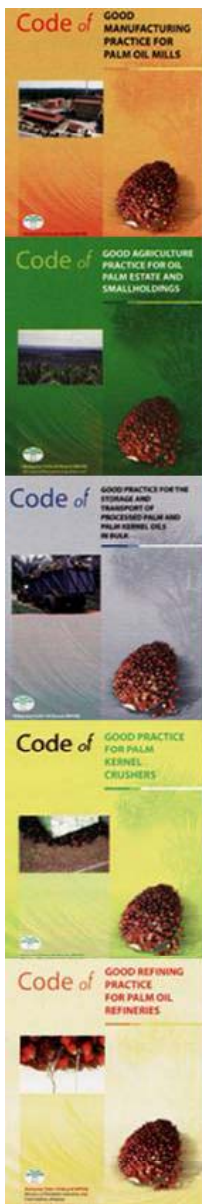
1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Maintain accuracy
3	<b>Principles</b>	Average error < 0.3%
4	<b>Criteria</b>	Yearly calibration & certification
5	<b>Indicators</b>	Document related data
6	<b>Verifiers</b>	Audit-internal/external





## 2. FFB Hoppers & Apron

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Unload FFB in hopper <u>not on apron</u> . Keep them clean. First in first out
3	<b>Principles</b>	Prevent bruising of bunches & FFA rise. Food safety-cleanliness
4	<b>Criteria</b>	FFA<5% Visual inspection, CCTV
5	<b>Indicators</b>	Documentation of FFA analyses
6	<b>Verifiers</b>	Audit-internal/external



## 3. FFB GRADING

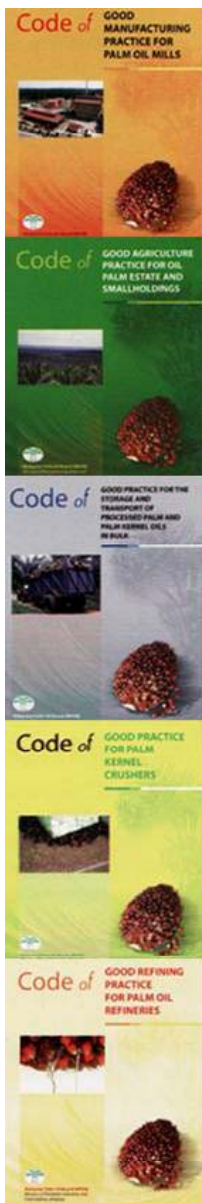
1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Receive only good quality FFB
3	<b>Principles</b>	To ensure good extraction and quality products
4	<b>Criteria</b>	FFA < 5%, DOBI > 2.3% in CPO. Reject off-quality crop, loose fruits >8%, zero contamination in FFB
5	<b>Indicators</b>	Production book, Lab records, buyer's data on quality.
6	<b>Verifiers</b>	Audit-internal/external

## 4. FFB UNLOADING FACILITY

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Prevent bruising of FFB
3	<b>Principles</b>	Ensure hopper space for FFB storage
4	<b>Criteria</b>	Minimum 8 hours storage space
5	<b>Indicators</b>	CCTV Zero dumping on hopper apron
6	<b>Verifiers</b>	Audit-internal/external

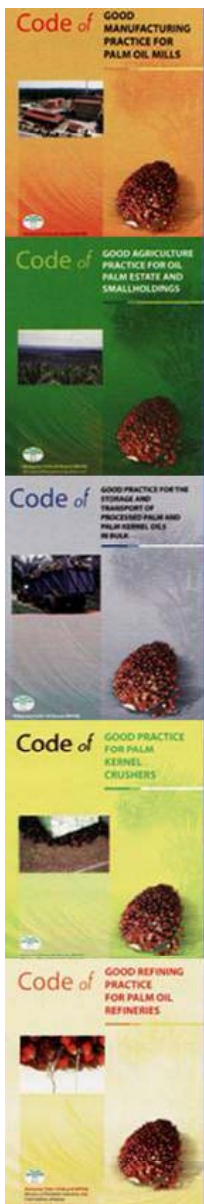






## 5. CAGE FILLING

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	To prevent spillage resulting in bruising of fruits.
3	<b>Principles</b>	Bruising results in a rise in FFA- CPO quality deterioration
4	<b>Criteria</b>	Single point filling reduces this
5	<b>Indicators</b>	Routine inspection for spilled fruit
6	<b>Verifiers</b>	Audit-internal/external



## 6. CAGE MATERIAL

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Prevent iron & copper contamination of CPO by using Stainless steel material
3	<b>Principles</b>	Mild steel causes oxidation of CPO
4	<b>Criteria</b>	Quality deterioration of CPO
5	<b>Indicators</b>	DOBI analyses of CPO
6	<b>Verifiers</b>	Audit-internal/external



# 7. STERILIZER CONSTRUCTION/ DESIGN

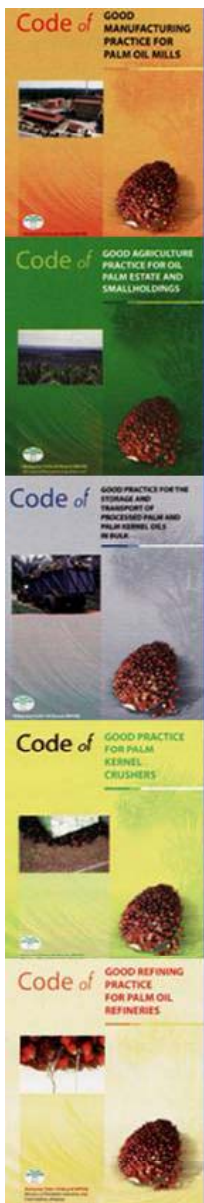
1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Prevent iron contamination by lining sterilizer with s/s or ceramic material
3	<b>Principles</b>	Iron in CPO promotes oxidation
4	<b>Criteria</b>	Quality deterioration of CPO
5	<b>Indicators</b>	DOBI value of CPO
6	<b>Verifiers</b>	Audit-internal/external





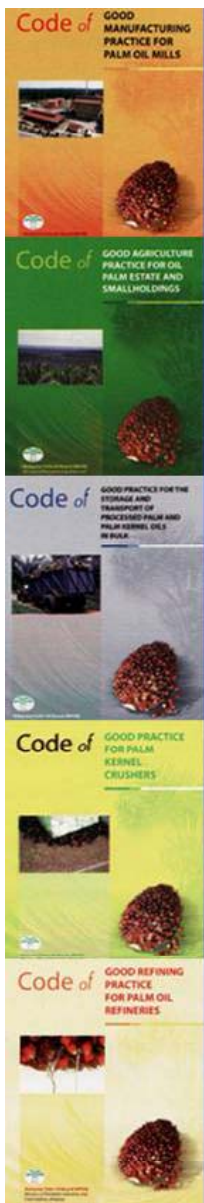
## 8. STERILIZATION.

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	To ensure by good de-aeration by continuous bleeding of condensate
3	<b>Principles</b>	Air is an insulator that prevents heat transfer into bunches
4	<b>Criteria</b>	To ensure 100% FFB stripping.
5	<b>Indicators</b>	Stripping efficiency- % Un-stripped bunches
6	<b>Verifiers</b>	Audit-internal/external



## 9. STERILIZATION CONDENSATE

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Stop sterilizer condensate recycling to prevent CPO contamination
3	<b>Principles</b>	To reduce oxidation of CPO
4	<b>Criteria</b>	To maintain quality of CPO
5	<b>Indicators</b>	DOBI check and metal content in CPO
6	<b>Verifiers</b>	Audit-internal/external



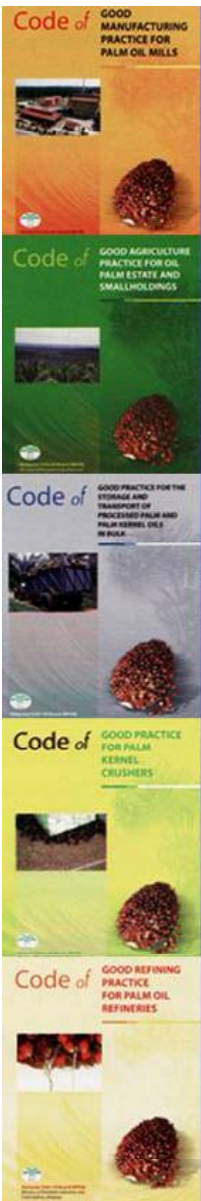
# 10. STERILIZED BUNCH ELEVATOR

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	To prevent fruit contamination with grease
3	<b>Principles</b>	Grease/lubricant contamination lowers the quality of CPO
4	<b>Criteria</b>	Grease is hydro carbon not allowed in food products unless vegetable based.
5	<b>Indicators</b>	Test for hydro carbon contamination
6	<b>Verifiers</b>	Audit-internal/external



11.OVERHEAD HOIST/ TIPPER/THRESHER		
1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	To prevent fruit contamination with grease
3	<b>Principles</b>	Grease/lubricant contamination lowers the quality of CPO
4	<b>Criteria</b>	Grease is hydro carbon not allowed in food products unless vegetable based.
5	<b>Indicators</b>	Test for % hydrocarbon in CPO
6	<b>Verifiers</b>	Audit-internal/external

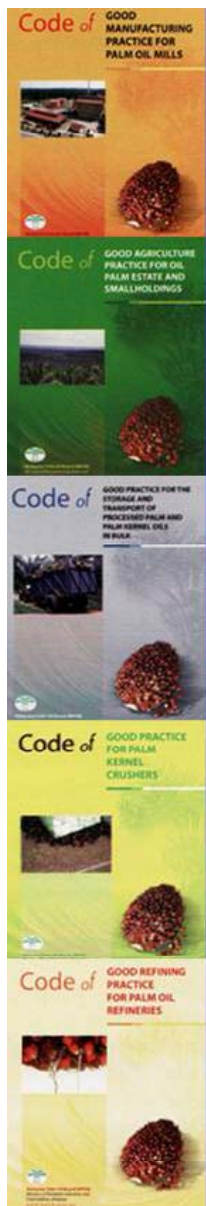




# 12. DIGESTER CONSTRUCTION

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Prevent iron contamination by lining digester with s/s or ceramic material
3	<b>Principles</b>	Iron in CPO promotes oxidation
4	<b>Criteria</b>	Enhance quality of CPO
5	<b>Indicators</b>	DOBI value of CPO
6	<b>Verifiers</b>	Audit-internal/external





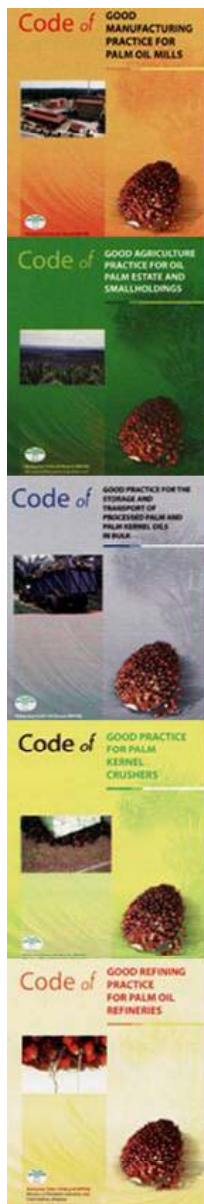
# 13.DIGESTION OPERATION

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Maintain $\frac{3}{4}$ full, Least gap between arms and the body, temperature $>90^{\circ}\text{C}$ . Ensure maximum digester drainage
3	<b>Principles</b>	For good digestion-promotes cell rupture, reduce oil loss
4	<b>Criteria</b>	Extract maximum oil- minimum oil loss
5	<b>Indicators</b>	Lab tests
6	<b>Verifiers</b>	Audit-internal/external



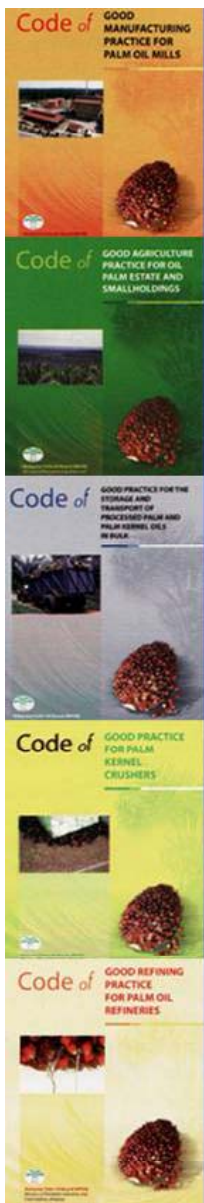
14. PRESS CONSTRUCTION/OPERATION		
1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Prevent iron contamination by hard facing press screws to reduce wear
3	<b>Principles</b>	Iron in CPO promotes oxidation
4	<b>Criteria</b>	Quality deterioration of CPO
5	<b>Indicators</b>	DOBI value of CPO
6	<b>Verifiers</b>	Audit-internal/external





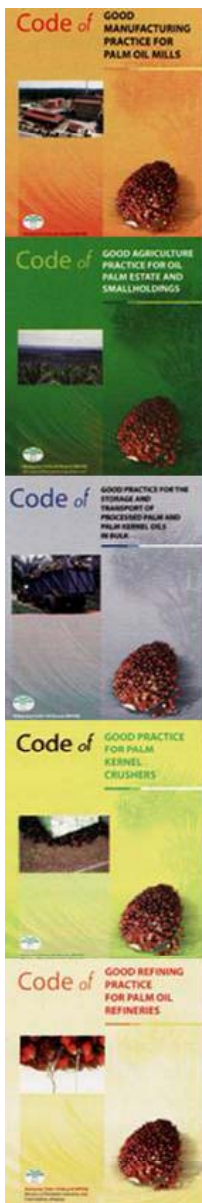
# 15. VIBRATING SCREEN/ CRUDE OIL TANK/PUMPS

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Ensure good screening of tailing from CPO
3	<b>Principles</b>	Solids in CPO obstructs oil separation from crude
4	<b>Criteria</b>	Improved oil extraction
5	<b>Indicators</b>	Lab analysis for oil loss in waste water
6	<b>Verifiers</b>	Audit-internal/external



# 16. CRUDE OIL TANK

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Ensure least iron contamination of CPO
3	<b>Principles</b>	To reduce oxidation of CPO
4	<b>Criteria</b>	To maintain CPO quality
5	<b>Indicators</b>	Lab analysis for oil loss in waste water
6	<b>Verifiers</b>	Audit-internal/external

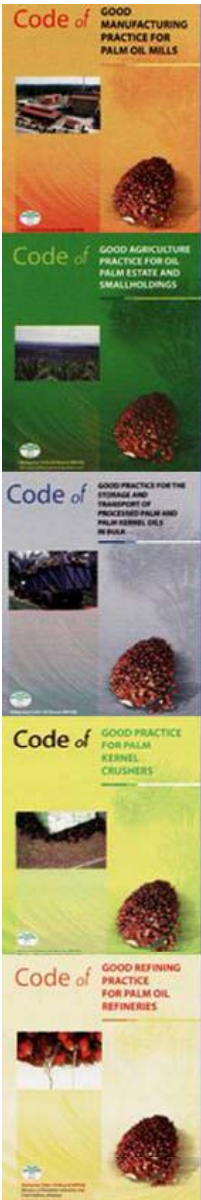


# 17. CRUDE OIL PUMPS

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	To prevent emulsification of CPO by using positive displacement pump
3	<b>Principles</b>	Difficult to separate emulsified oil
4	<b>Criteria</b>	Reduce oil loss in waste water
5	<b>Indicators</b>	Lab analysis for oil loss in waste water
6	<b>Verifiers</b>	Audit-internal/external



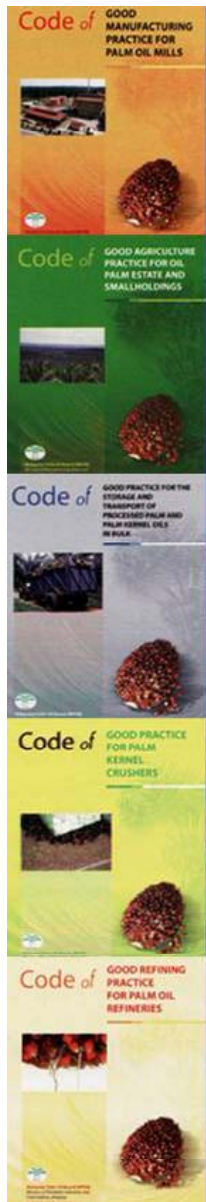




## 18. CLARIFICATION PROCESS

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Maintain temperature > 90° C
3	<b>Principles</b>	At high temperature least viscosity and best separation
4	<b>Criteria</b>	Better oil extraction
5	<b>Indicators</b>	Lab analysis
6	<b>Verifiers</b>	Audit-internal/external

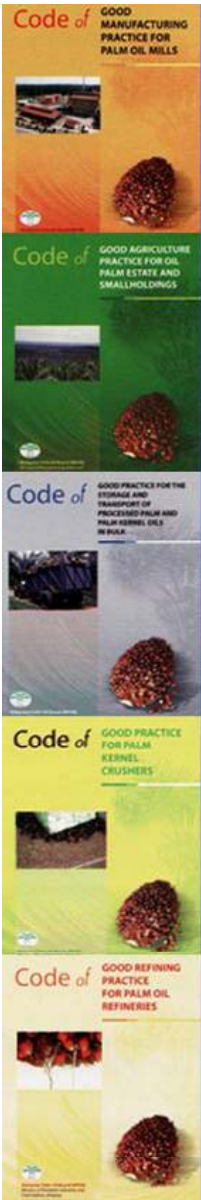
# 19. CLARIFICATION TANK

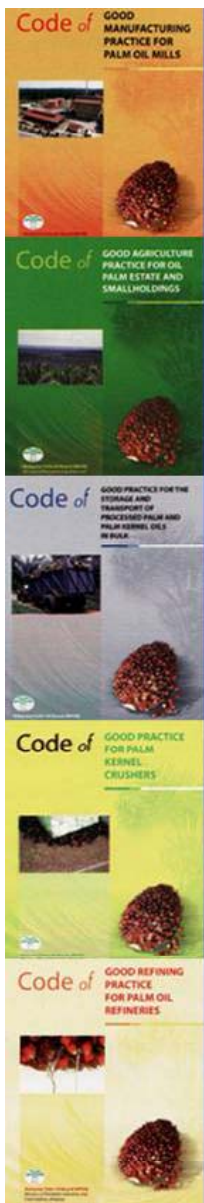


1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Use non ferrous material or s/s for lining to reduce iron contamination
3	<b>Principles</b>	To reduce oxidation of CPO
4	<b>Criteria</b>	To maintain quality of CPO
5	<b>Indicators</b>	Lab analysis for iron and DOBI values
6	<b>Verifiers</b>	Audit-internal/external

# 20.OIL PURIFICATION & DRYING

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Ensure > 700 mm vacuum to ensure good drying of CPO
3	<b>Principles</b>	To maintain low moisture & dirt level in production CPO
4	<b>Criteria</b>	Maintain moisture <0.15%, dirt < 0.015 to ensure product quality
5	<b>Indicators</b>	Lab analysis
6	<b>Verifiers</b>	Audit-internal/external

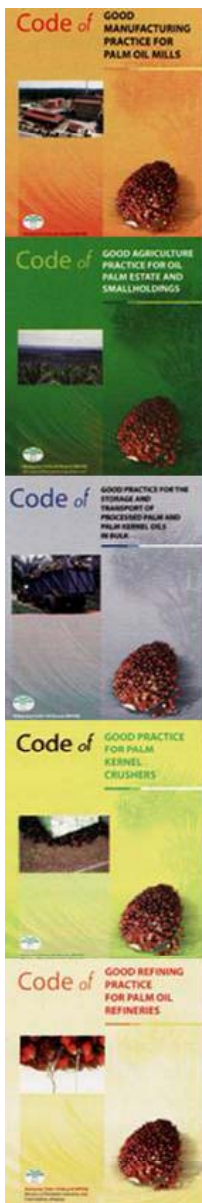




# 21. CUDE PALM OIL STORAGE

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Maintain temperature below 50°C by automatic temperature control system
3	<b>Principles</b>	To reduce oxidation of CPO
4	<b>Criteria</b>	To maintain quality of CPO
5	<b>Indicators</b>	Lab tests DOBI values
6	<b>Verifiers</b>	Audit-internal/external





## 22. CPO STORAGE TANK

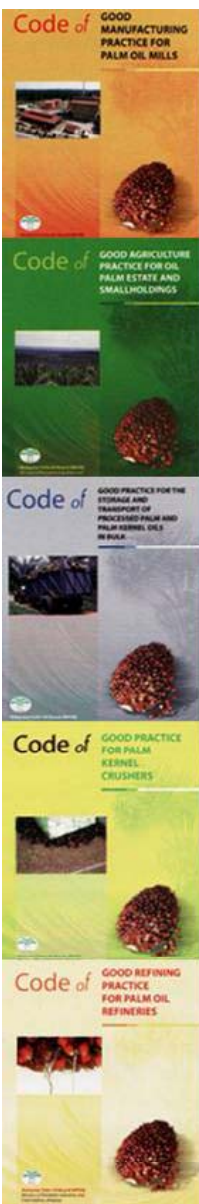
<b>1</b>	<b>Scope</b>	Food Product Application
<b>2</b>	<b>Objective</b>	Must be coated, bottom 3 meters with epoxy, s/s, ceramic or linseed oil
<b>3</b>	<b>Principles</b>	Reduce iron pick up by CPO
<b>4</b>	<b>Criteria</b>	Iron causes oxidation of oil
<b>5</b>	<b>Indicators</b>	Lab tests for DOB, iron content
<b>6</b>	<b>Verifiers</b>	Audit-internal/external





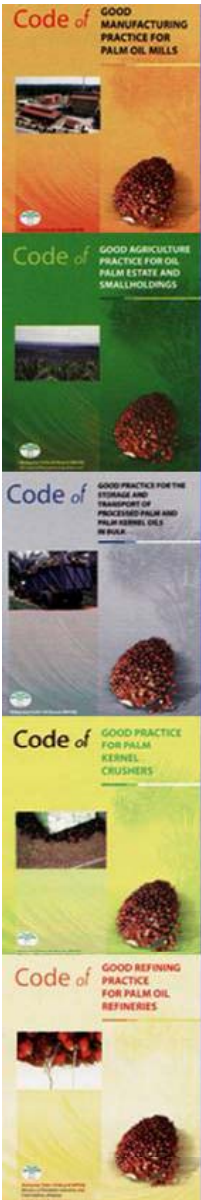
## 23. CPO TRANSPORTATION

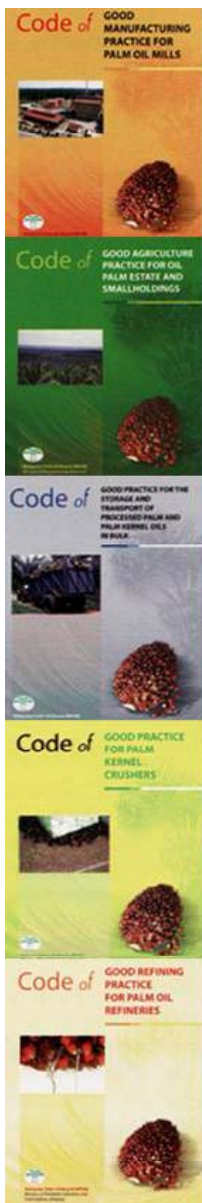
1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Tanks must be clean and sterilized with hot water
3	<b>Principles</b>	To prevent entry of microbes into CPO
4	<b>Criteria</b>	CPO must be free from microbes- traceability – marketing tool
5	<b>Indicators</b>	
6	<b>Verifiers</b>	Audit-internal/external



# 24. SLUDGE HANDLING

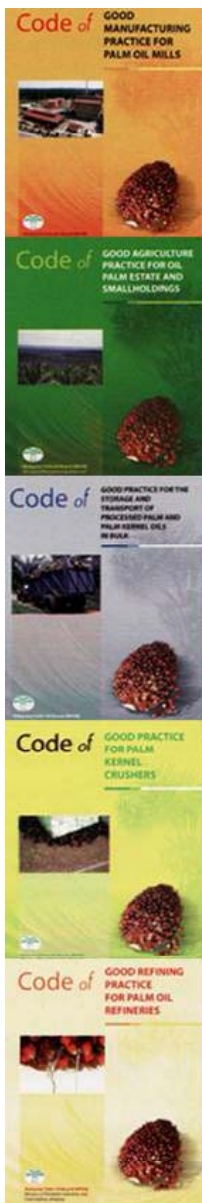
1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Oil from sludge must not be recycled into process line
3	<b>Principles</b>	Causes introduction of microbes
4	<b>Criteria</b>	CPO must be free from microbes- traceability – marketing tool
5	<b>Indicators</b>	Test for microbes on a routine basis
6	<b>Verifiers</b>	Audit-internal/external





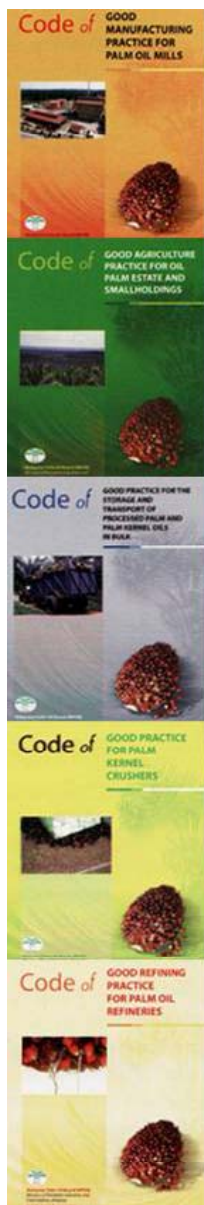
## 25. KERNEL DRYING PROCESS

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Ensure kernel drying with hot air at 70° C for a minimum of 14 hours
3	<b>Principles</b>	Kernel heating must ensure a moisture level < 7%.
4	<b>Criteria</b>	To prevent the kernel from being moldy
5	<b>Indicators</b>	Analysis of kernel dryness
6	<b>Verifiers</b>	Audit-internal/external



## 26. KERNEL STORAGE

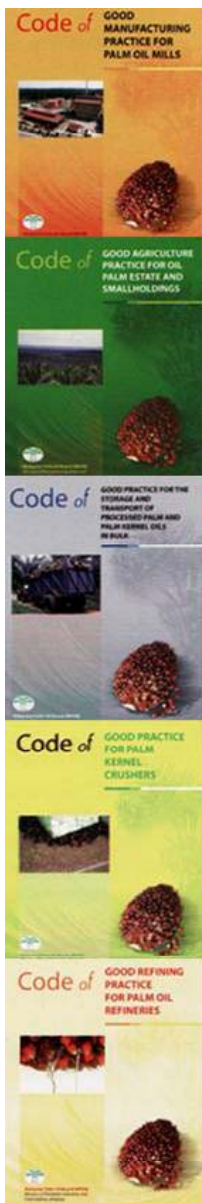
1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Must be stored in silos, bunkers or bags and never dumped on floor
3	<b>Principles</b>	Danger of microbial contamination by dogs, cats, rats, birds etc
4	<b>Criteria</b>	Kernel must be free from microbes- traceability issue loss of market
5	<b>Indicators</b>	Management policy and strict implementation. Regular checks
6	<b>Verifiers</b>	Audit-internal/external



## 27. NUT CRACKING PROCESS

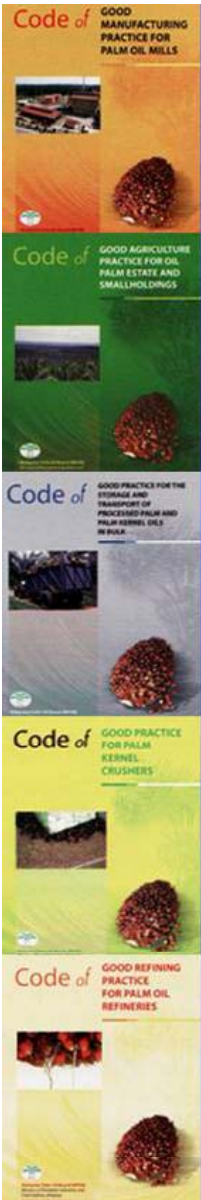
1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Broken kernel must be as low as possible by using good nut crackers
3	<b>Principles</b>	Broken kernel subject to microbial contamination
4	<b>Criteria</b>	Food safety to be maintained to enhance marketability of kernel products
5	<b>Indicators</b>	Regular lab analyses for microbes
6	<b>Verifiers</b>	Audit-internal/external





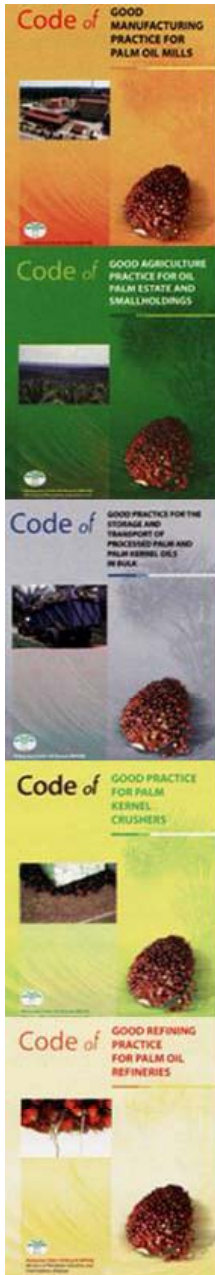
## 28. ENVIRONMENT

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	Boiler smoke emission to conform to DOE limits
3	<b>Principles</b>	Will cause pollution of atmosphere
4	<b>Criteria</b>	Detrimental to health and well-being of people
5	<b>Indicators</b>	Lab results and DOE checks
6	<b>Verifiers</b>	Audit-internal/external



## 29. PALM OIL MILL EFFLUENT

1	<b>Scope</b>	Food Product Application
2	<b>Objective</b>	BOD of effluent to meet DOE limits all the time
3	<b>Principles</b>	To prevent endangering eco systems and water contamination
4	<b>Criteria</b>	Global requirement to preserve eco system
5	<b>Indicators</b>	Analysis on a routine basis
6	<b>Verifiers</b>	Audit-internal/external



# THANK YOU

FOR LISTENING  
BUT  
PLEASE IMPLEMENT  
WHAT YOU JUST HEARD